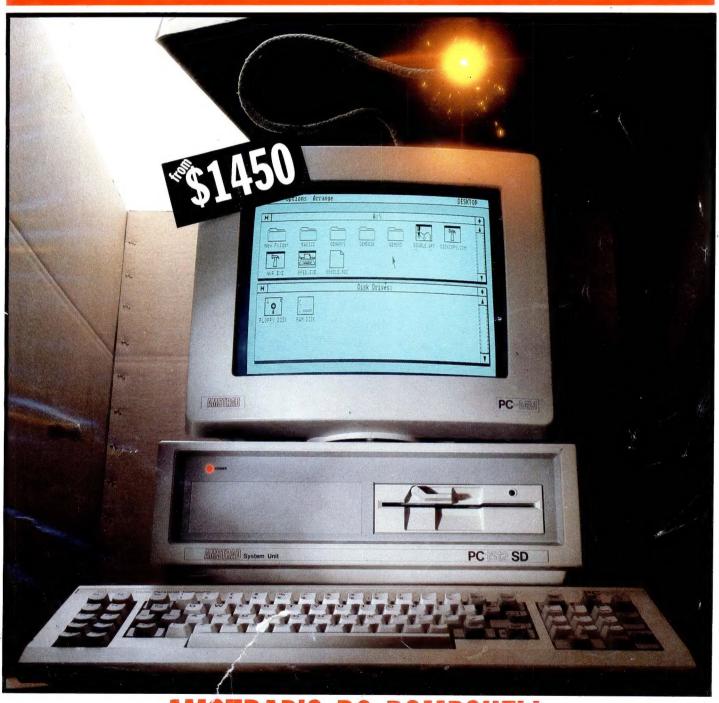
# Personal COMPUTATION OF PUBLICATIONS VBP 3691 Australian Personal Computation of the Com

### AUSTRALIA'S TOP SELLING COMPUTER MAGAZINE



AMSTRAD'S PC BOMBSHELL

### New Macintosh Plus. We've added



Which means you can run the most sophisticated software without running out of memory. And manage larger spreadsheets, documents and databases.

We also doubled the ROM to 128K, doubling the speed of accessing most of your application programs and data files, through the new Hierarchical File System and RAM-caching support.

The Plus also contains a builtin, double-sided, 800K disk drive.

This provides

This year Apple introduces a new Macintosh.

Macintosh Plus.

As the name suggests, it's evolutionary, rather than revolutionary

(It's not our policy to bring out totally new computers for the sake of it. Instead we strive to perfect existing ones.)

Macintosh Plus is as simple to learn and use as before.

But there are some big differences, encouraged, we don't mind admitting, by current Macintosh owners.

Some of you asked for more power, others speed. Some needed greater storage capacity, others expandability.

Some heavy numbercrunchers wanted a numeric key pad and conventional cursor keys built into the keyboard rather than remote.

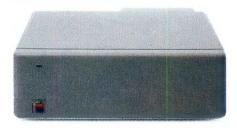
Done. Done. And done.

The pluses of this new Macintosh include a full megabyte of RAM (expandable to four megabytes).

twice the capacity of the previous Macintosh and the equivalent of 400 typed pages, or a bulging file drawer.



If that's still not enough, you can always plug in another 800K external drive.



Or you can really go all out and add our new Hard Disk 20.

(Its 20 megabytes are about 10,000 pages worth.)

Just plug in a Macintosh Hard Disk 20 and you can keep all your software, files, worksheets and documents within a moment's notice of your screen.

Add the Apple program Switcher, and you can actually work with several applications at once, moving information from one into another with the greatest of ease.

So you can transfer notes from an outline to a report – or numbers from a data file to a spreadsheet – as fast as you can click your mouse.

AppleCare.

All Apple products come with an automatic 3-month warranty covering all parts and labour.

But this year, Apple introduced a sort of "Warranty Plus" through the AppleCare service programme.

If you fill out and mail to us the registration form enclosed with your equipment, you will receive nine extra months' cover on top of the normal three.

Macintosh Plus also features a new SCSI connection port (dubbed "Scuzzy" in typical fashion by the development team).

SCSI stands for Small Computer Systems Interface and it's an industry standard.

We've virtually opened up the architecture. But what we've really done, of course, is open up a whole new world of possibilities.

The Scuzzy port let's you daisy-chain up to seven high-performance (and often low-priced) peripherals like hard disks, file servers and tape backups from all sorts of third parties.

Given all this power, it made sense to team it with equally im-

pressive printers.

The new LaserWriter Plus is just such, producing documents with text and graphics of publishing quality.

### everything except complications.

And it maintains this fidelity on copy paper, letterhead, labels, envelopes or overhead transparencies.



LaserWriter Plus has 35 different typefaces built in, a choice that would embarrass your local printer (and his invoices).

But if you don't need publication-quality printing, you can have near letter-quality by teaming up your Macintosh with the Image-Writer II.



It prints in three different modes: high-quality, standard and draft. And churns it out at speeds of up to 2½ pages per minute.

You can feed in single sheets automatically with the optional SheetFeeder.

And print up to seven colours using appropriate software.

ImageWriter II can also be shared with other Macintosh users via AppleTalk.

But this Macintosh isn't called Plus for nothing. You can just add and add.

Items like an AppleTalk Personal Network.

It's the most flexible, low-cost, easy-to-set-up, easy-to-use net-work around.

It'll connect up an office full of Macintoshes, LaserWriters, ImageWriters and file and disk servers – 32 devices in all.

Using an electronic mail

package, you can send messages to any Macintosh screen



Or with EtherMac software you can share information with other computers. (Our computer is so friendly it'll even talk to IBMs.)



Add an Apple Modem 1200 to your Macintosh and you can talk to anyone virtually anywhere.

With a communications program like MacTerminal, a standard telephone and an Apple modem, your Macintosh can plug into electronic information services like Viatel, Minerva and Midas and communicate with mainframes and minicomputers.

If you already own a Macintosh, there's another plus.

You can upgrade your machine to the new one megabyte. Ask your dealer for upgrade details.

You can also upgrade your LaserWriter to become a Laser-Writer Plus.

Get hands-on with the new Macintosh Plus.

You should like it. You helped design it.



### The Apple business card.

If you wish to own a Macintosh system, you can take advantage of the Apple Credit Card, available from participating dealers.

You can use it to purchase computers, peripheral equipment and software with no down-payment and less impact on your cash flow.

If you qualify, in most cases you can take your own Macintosh with you and dive straight into work with it the same day.

For an authorised Apple dealer near you outside Sydney, you call toll-free (008) 22 1555 or Sydney 908 9088.

AP 219/Palace



# A PC CONTENTS

Volume 7, Number 11, November 1986

### **REGULARS**

### 5 NEWSPRINT

Guy Kewney admits an error.

### **66** BANKS' STATEMENT

Martin Banks believes that the micro market can't stand more than one major manufacturer at any one time. Is this a case of IBM forever?

### 81 LETTERS

Our correspondence column.

#### 89 YANKEE DOODLES

Can a software house limit its liabilities when a bug causes thousands of dollars worth of damage? David Ahl reports on an important test case from the States.

### 169 WHAT'S NEW

lan Davies summarises the latest product announcements.

#### 183 BIBLIOFILE

The latest books and the latest words from David Taylor.

#### 185 SUBSCRIPTIONS

Finding copies of APC in newsagents is becoming increasingly difficult, but there is a solution.



### 188 SCREENPLAY

We've always thought that the Commodore Amiga was the ultimate games machine, and Stephen Applebaum confirms it.

### 191 COMMUNICATIONS

What's new in the micro communications world.

### 199 SUBSET

David Barrow concentrates on Motorola chips.

### 209 END ZONE

Maths, Puzzles, User Groups Update, Benchmarks and forthcoming events.

#### 217 PROGRAM FILE

The best of readers' programs presented by Owen

### 255 ADVERTISERS' INDEX

A who's who of the industry.

ChipChat returns next month.







Editorial Managing Editor Sean Howard; Assistant Editor Maria Bokic; Consultant Editors Steve Withers, Ian Davies. Advertising Advertising Manager Mark Reiss; NSW and Old Sales Michael Komoroski. NSW and Old Sales Executive John Nuutinen (02) 264 1266; Vic, SA. WA and Tas Sales Manager Gerard Kohne (03) 531 8411. Production Graphic Heart Pty Ltd. Distribution Subscriptions Manager Judy Welsh (02) 264 1266; Subscription rates Australia \$42 per annum, overseas A\$70 (surface) A\$160 (airmail); Newstand sales: Network Distribution Co. 54 Park Street. Sydney 2000.

Publishers Computer Publications Pty Ltd (a subsidiary of Consolidated Press (Holdings) Ltd).

Sydney Office: 215 Clarence Street, Sydney 2000; telephone (02) 264 1266; telex AA 20514 CONPRES. Melbourne Office: 77 Glenhuntly Road, Elwood 3184; telephone (03) 531 8411; telex AA 30333 'AMJ'.

Printed by Quadricolor International (Aust.) Pty Ltd. Material contained within Australian Personal Computer is protected under the Commonwealth Copyright Act 1968. No material may be reproduced in part or whole without written consent from the copyright holders. Produced under licence from Computing Publications and VNU Business Publications B.V.



### **FEATURES**

### 4 90 NEW TRICKS FOR OLD MICE

Dick Pountain explains how to program the Microsoft Mouse for integration into your favourite applications.

### 98 READY, WILLING AND ABLE

The disabled can play a full part in the computer world. Kester Cranswick explains how.

### □ 112 RIGHTING WRONGS

Mike James points out the pitfalls of debugging, and describes a methodological approach involving exception handling and flag control.

### 122 TRUTH TESTS

The AI series continues as David Levy describes the theory behind proving theorems correct.

#### 145 MS-DOS PROGRAMMING

lan Davies doing what he does best — delving into operating systems. But now he'll show you how to do it in this new series.



### 161 IBM'S TOKEN RING NETWORK

Paulo Baccanello explains the Token Ring Network's operation and takes a close look at one in action.

### 193 IN THE NICK OF TIME

APC has devised a new set of Benchmarks to test any machine in any programming language.



### **BENCHTESTS & REVIEWS**

### 18 AMSTRAD PC1512

With absolutely no attempt to curb his enthusiasm, Guy Kewney benchtests the latest machine from Amstrad — a go-faster PC clone which includes monitor, keyboard and bundled software and will sell for around \$1450.

### 33 BUSINESS GRAPHICS

Harvard Presentation Graphics and Perspective get the visual once-over on the IBM PC.

### 42 COMPAQ DESKPRO 386

The first machine to reach us which contains Intel's 80386 processor. With a true 16MHz 32-bit processor and up to 16Mbytes of RAM, this is the fastest PC-compatible we've seen. Peter Jackson is unleashed onto all this computing power.

#### **56** PFS: FIRST CHOICE

The trend towards budget-priced IBM PC software is creating some interesting products. John Donaldson assesses a new integrated package from pfs that really is easy to use.

#### 68 TAS PLUS

On paper, TAS Plus has the specification to make it a dBase basher, yet it costs a fraction of the price. Our database expert Kathy Lang puts it through its paces.

### 131 SMALLTALK V

Carl Phillips explains the philosophy behind objectorientated programming, and takes a look at the new, inexpensive version of Smalltalk V for the IBM.





"TCAN'T find that bit of paper with his address on it?"
"That HOT prospect's name and number is GONE!"
"Has it been THAT LONG since I called you last?"
"Was I supposed to send that yesterday?"
"What were we talking about last time?"
"You're John WHO from WHERE?"

"You want ME to type HOW MANY labels and letters?!?!"

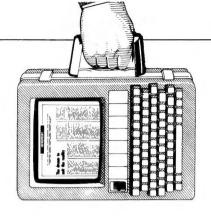
MAKE EXCUSES? NO!

### GET TRACKER\$149.00

THE interactive filing and prospecting software from Softcode Australia

Dealer enquiries only: ADAPTIVE ELECTRONICS PTY LTD (03) 267 6800

### **NEWSPRINT**



In this month's news round-up Guy Kewney looks at how compatible the new Amstrad really is and sounds the red alert for home users.

### **Amstrad clarification**

In my Benchtest of Amstrad's new PC published in this issue I state that an EGA card will not work with the machine. Well, the good news is that, after all, it is possible to plug an Enhanced Graphics Adaptor card (EGA) into the Amstrad PC. The bad news: there are going to be more video applications which fail on that machine, than at first I realised.

Careless, I suppose, to have suggested that 'the EGA card will not work with the Amstrad PC' when, in point of fact, it will. More precisely, then: the EGA card, which provides more colours on an IBM display. and has the option of switching across into a very high resolution with certain animation abilities on a highscan rate screen, will only work in its 'monochrome' low-resolution mode on the Amstrad.

In this form, it is pretty well indistinguishable from the standard Amstrad PC colour display.

With a logic which I now recognise to have been flawed, I reasoned that since nobody would plug-in \$1200 worth of hardware to achieve a display resolution identical to the display resolution already there, this aspect was discountable.

Wrong! The deviousness of computer users is legendary. By plugging an EGA card into a standard PC and then attaching costly extra circuitry, it's possible to construct a system of integrated computer display

and video (moving pictures).

For someone who uses this system, the fact that the EGA card actually does work, even if in lowresolution mode, is crucial.

I have this information, not because I diligently obtained the address of every EGA supplier and questioned them closely about possible add-ons, and then plugged these into an Amstrad; but because a friend rang me up and quite understandably described me as a turkey. Basing his opinions on an advance copy of my review of the machine, he had made firm recommendations to a client that they buy another type of PC. 'Nonsense', they said, 'we're buying 20. The card works just fine . . .

The news on the video front generally, however, is not all good.

The chips inside the PC 1512 imitate the function of the chips inside the IBM PC — but they achieve the effects by different means.

The IBM video display is controlled by a chip called the 6845, which has several registers, and dividers. It keeps track of where on the screen each character is, and constructs the shape of them as the video signal flashes back and forth, scanning down the screen.

Normally, these registers are fed with a few, standard numbers, which are used to switch between 40 and 80-column mode, or into display resolutions. The Amstrad can do these standard things, using a different

technique, involving logic gates which do these modes and no others.

On the PC itself, there are programs which can also feed sily numbers into the 6845 registers, producing odd video effects. On the PC 1512, these programs will produce no result, because there are no such registers.

The phenomenon is documented. Amstrad has suggested to software developers that they use it to 'cripple' expensive software, so that it will not work on the standard PC. What they do (the Amstrad version of SideKick was going to be one of these) is to write those stupid numbers into the 6845 registers. If the machine is an Amstrad, there are no registers and nothing happens. If it is a genuine PC, however, the video aets scrambled and the program ceases to be usable.

So, the software company can sell more expensive programs to the rich people who bought full-priced machines while the plebs who buy Amstrads can be satisfied with the same program at half the price.

Time will tell whether the idea is a clever one.

The effect of writing into the 6845 registers, however, is not one which is known only to copy protection obsessives. There are video toolboxes, which use the 6845 deliberately to create interesting effects. And any program which uses these effects will fail on the Amstrad.

The plus side of the bargain is that the numbers have to be chosen with care. It is (I am assured) quite

possible to feed data into the 6845 registers which will actually cause the display monitor to burn up, as it in vain tries to lock onto a scan pattern outside its frequency range. And this cannot happen on the Amstrad.

Guy Kewney

### A doctor for the family

I have recovered an IBM disk on which there was not one particle of information left on the outside track, track zero. In doing so, I found Norton's Utilities, which everyone swears you can't live without, and I found them to be useless in dealing with the problem. But the disk has been recovered.

Although the achievement was Carl Phillips', not my own, it is an achievement. It is also a confession of incredible stupidity, because it takes quite a lot of that to format track zero (on which all directory information is held) on an IBM disk.

To my amazement, however, any disk which has a damaged track zero is a disk which Norton's Utilities (bow down, scrape) will not look at.

Carl Phillips (see his Smalltalk V Screentest this issue) is one of those wandering programmers who knows more about the insides of the PC and family than the designers do, and he has met the problem before. His utilities don't read the disk as if it were a PC disk, but as if it were a

### nXT 640K parallel, serial clock, DOS incl S/T ND 20 MEG 1024K **2,950** incl Parallel, Serial Clock, Cat, DOS ABLE-1 incl S/T FREE DEALER & HOTLINE easy software that does it all: integrated **\$250 RR** inc. S/Tax **DEALERS & CORPORATE BUYERS** SOFTWARE bundle ABLE-1 with your computer huge bulk discounts and we provide training Australia wide HAREWARE dealerships negotiable buy in lots of 5, 10, 20, 50. you dream ... of LOW PRICES ... you dream . . . of SOLID GEAR... you buy... in LOTS OF 10... IMPORTER PRICES... vou want . . . plus 14/30 days credit same day REPLACEMENT of failures THINK... of becoming a dealer for us... US Computers 817 4129 ABLE-INTERNATIONAL AUSTRALIA

### **NEWSPRINT**

piece of magnetic-coated plastic.

On an IBM disk, you look for a file by going to the index — track zero. It tells you what tracks and sectors the file covers. Norton's copes with errors in the index, or deletions in the index — a file which has been erased is still there, and if you look at the index, you will find that it still knows where it is, but pretends that it has gone. You tell it to pretend it hasn't gone.

But without track zero, Norton's simply won't work! Given the reputation of Norton's I found this hard to believe — a bit like going to a medical specialist, cash in hand, and being greeted with: 'But you're ill I can't cure you if you're ill!'

I found several other utilities to suffer from the same disastrous short-coming.

But Carl's utility shows the data on each sector in hex, with an ASCII dump in parallel. You look on your disk, laboriously, until you find your file, and then you note which physical sectors it covers. When you think you have them all, you tell another Phillips utility what they are. It creates a new file, on any disk you like, with those sectors collected together, in the order you specify, and bang! You're

Meanwhile, don't put your favourite diskette into the floppy disk of an AT and type 'format'. The story of how I came to do that is long, shaming, and frankly, so incredible that I myself don't really believe I did it. But that's how I lost track zero.

Anyone needing to contact Carl Phillips should drop APC a note, and we'll forward it to him.
Guy Kewney

### Japan powers in

As if it weren't bad enough

that the US is losing the lead in semiconductor sales. the industry now has a new worry: Japan may end up controlling the market for the silicon wafers from which chips are made. Silted is the object of a proposed \$US30 million takeover by Japan's Mitsubishi Metal. Monsanto Electronics Materials, the other US wafer supplier, may also be on the block, according to Daniel Rose, a Los Altos consultant and publisher of Electronic Materials Report. Monsanto denies the subsidiary is for sale, even though it racked up losses totalling \$US80 million in the past 18 months.

In addition, the Japanese have been buying into US producers of polysilicon, the raw material for wafers, and they already control twothirds of the market for the materials used in packaging integrated circuits. Should US companies become dependent on foreign sources for all these building block materials, Rose warns, US chipmakers "will lose a lot of leverage over quality, prices, and technology.

## When is WordStar not WordStar?

There is a 'special' (cheap) version of WordStar, WordStar 1512, especially for buyers of low-cost IBM clones like the Amstrad PC 1512.

Don't believe everything you hear about it. WordStar is not a subject where reviewers are capable of objective statements. And, specifically, don't fall into the trap of believing that, just because it says 'WordStar' on the label, you are getting WordStar in the box.

And, to save you reading all the way through this before getting it, I would add one piece of advice: don't buy WordStar 1512 if



### INTRODUCING THE A\*STAR II"

We're having a party! It's a going away party. And, it's for IBM. But, shhhhh! Don't tell them. We want it to be a surprise!

Why a party? Well, it's because we've been told that more than a few of IBM's customers have been "going away" ever since we introduced our A★Star™PC/AT compatible microcomputer. Now that we've announced our new A★Star II, we figure a lot more of their customers will be going away. That's because the A★Star II is the only "network ready" PC/AT compatible that can operate at 6, 8, 10 and 12 MHz. And because it's now available locally in a super selection of low-cost models.

The A★Star II is not just another clone, it's better...much better! Not only is it faster and more powerful

than IBM's model, it's also incredibly less expensive. Better yet, the A★Star II is built and backed by Wells Americana company that's been making microcomputers longer than IBM. (We bet that surprises even you!) But more than just an AT compatible, the A★Star II is both a single and a multiuser system. Each unit is factory equipped for network operation with up to 254 other A★Star, IBM or compatible computers!

If you'd like to be a part of our IBM going away party, clip and return the coupon or call us at one of the numbers below. But don't tell IBM! If they find out how many of their customers are going away, they might just go away themselves! Of course, that would be okay with us. We never *really* invited them anyway!

### A 6, 8,10 AND 12 MHz AT? WHAT A REASON TO CELEBRATE!

☐ Sounds like a terrific party! Please send me the name of my local dealer.

The name of the local dealer.

I'm ready to celebrate NOW! Have your local dealer call or telex me immediately.

Yes, I would like an on-site demo. Please have one of your Sales Engineers call me. (Vic. only. Serious buyers only, please.)

Name:
Company:
Phone/Tix:
Address:
City:
State:
P/Code:

Sole Australian Agents:

KCM Computers Pty Ltd 380 Victoria Street, Richmond, Vic 3121 Australia Tel (03) 429 2733 Tlx:AA39766

From \$A2995.00

**DEALER ENQUIRIES WELCOME** 





### **SCREENTEST**

## TAS Plus

TAS Plus is a sub-\$150 system for the IBM PC/XT and AT which offers simple data entry and reporting together with powerful programming tools. Kathy Lang considers it excellent value for money.

A superficial survey of the micro scene this year would show a wave of pricecutting among software as well as hardware suppliers. A closer look would show that several suppliers have been beavering away doing their bit to get software prices down. Among the pioneers have been the proponents of Shareware in the US, those aggressive marketeers Borland, and — the company behind this month's database review, Business Tools Inc.

Among those crying 'Who?' there will doubtless be some of the many readers of this column who have, over the past few months, asked eagerly when I would be reviewing a package called TAS Plus. This product, distributed in this country by CPS Systems in South Australia, has been released at a price which seemed at first so low (\$199) that many people were anxious to know what the catch was. Well, the perfect database system has yet to be written - indeed, since there is an infinite variety both of applications and of users, I don't see how it can ever be - but my initial conclusion is that TAS Plus has remarkably few failings for what seems at the moment a remarkably cheap price.

TAS Plus is distributed for the IBM PC/XT and AT, in two versions: the basic release, at \$199, provides a wide range of data management facilities, including the ability to get started just by defining the fields in your file and using default formats for screen display and reporting. It also gives you the use of much more sophisticated features, including screen printing, a powerful programming language including the ability to handle one-dimensional arrays and overlays,

and an internal editor for modifying and building programs. Once built, these programs are compiled into intermediate code, which makes for fast processing (though the extent to which most database applications are disk-bound makes this less important than you might think). And for those building tailored systems, this code can be run without the source language being present, so tailored systems can be distributed without the user being able to tamper with the initial system.

To run TAS programs you need parts of TAS Plus, but although these are not supplied separately as a run-time system, substantial quantity discounts are available on the basic \$199 price for those wishing to sell on copies of their programs. And for the system developer who needs still more features, there is a Developer's Version of TAS. includes a range of system tools as well as the source code of several TAS modules written in TAS, such as the screen editor for entering and amending TAS programs, and costs \$569 for a single user version and \$869 for a multiuser version.

TAS needs 384k memory and two floppy drives to run on an IBM PC; where your data will fit on one floppy disk, it would be quite practicable to run TAS from a twin-floppy system. If you have more grandiose needs, there is a multiuser version of TAS with simple record and file locking. This runs on a variety of networks on IBM systems, and costs \$869 including the Developer's Version. An earlier version of TAS, with essentially the same functionality though with a less gee-whiz user image

and costing \$569, runs on other MS-DOS systems, under CP/M and CDOS, and on several implementations of networking in those environments.

### Constraints

The major features and constraints of TAS Plus are shown in Fig 1, and the main menu screen through which the facilities are provided by TAS itself (as distinct from a tailored system built with TAS) in Fig 2. The range of data types includes time as well as date, with arithmetic working correctly on both types of field; any field that is not a key field can be a (one-dimensional) array, making it relatively easy to store list data such as a person's leisure interests or languages spoken.

Numeric fields are stored in binary, thus halving the amount of storage they need compared with character storage, but in TAS Plus having the odd side effect that, if a number may take negative values, it must be defined as having an odd number of digits, in order to leave room to store the sign.

Data validation is not a strong point in TAS Plus — apart from checking that the data conforms to its defined type, about the only other built-in provision is the ability to define a mask which enumerates the values a variable may take, such as Y and N for a Yes/No field. You can, though, embed validation rules within the program that defines the screen layout for data entry.

The constraints shown first in Fig 1 are those for TAS Plus itself; those following the slash are for the Developer's Version. Several of the limits, for instance on

# Disks

ADD LUSTRE TO ANY COMPUTER



New Zealand: Dataset Computer Supplies (N.Z.) Ltd. Auckland 795-561 Wellington 857-686



## Now you've got one, what are you going to do with it?

Building a computer system that will do exactly what you want, is not as easy as you may have been lead to believe. At Roland, our years of experience talking to computer clients has proved that the average purchaser doesn't buy a custom made computer, they build features into them, by adding on software and hardware products that provide the best possible results.

By determining the best options you will need, Roland has taken out the problems of upgrading and replaced them with

packaged solutions, that work,

Whether you are considering the purchase of a computer or you wish to expand your current model, now is the time to see Roland for both hardware and software package solutions. With a full range of options and sound advice based on your immediate and long term needs, Roland has the solutions.

■ If you are looking for color on the IBM PC/XT/AT, Roland's EGA-KIT offers you 100% compatibility with IBM's Enhanced Graphics Adaptor produced on Roland's High Resolution CD 240 RGB color monitor, using STB's EGA-EXTRA.

■ Roland provides the ultimate monochrome solution for word processing, spreadsheet and graphics utilising STB's Chauffeur HT and Roland's MB 142 14" Black and White monitor, providing an absolute minimum of eve strain.

■ Enhance your business graphics with Windows Draw or upgrade to Computer Aided Drawing. Roland's CAD-KIT provides both the CAD software with In•a•Vision, plus the hardware that gives you the ultimate hard copy output solution. Roland Plotters.

Your Roland package solutions are only a telephone call away, or fill in the coupon that will enable Roland to mail you the appropriate technical information.

All product claims are fully endorsed and guaranteed by Roland DG. A full 12-month warranty, covering both labour and parts is given on all products.

Roland Corporation Australia Pty Ltd 50 Garden Street, South Yarra, Victoria 3141.

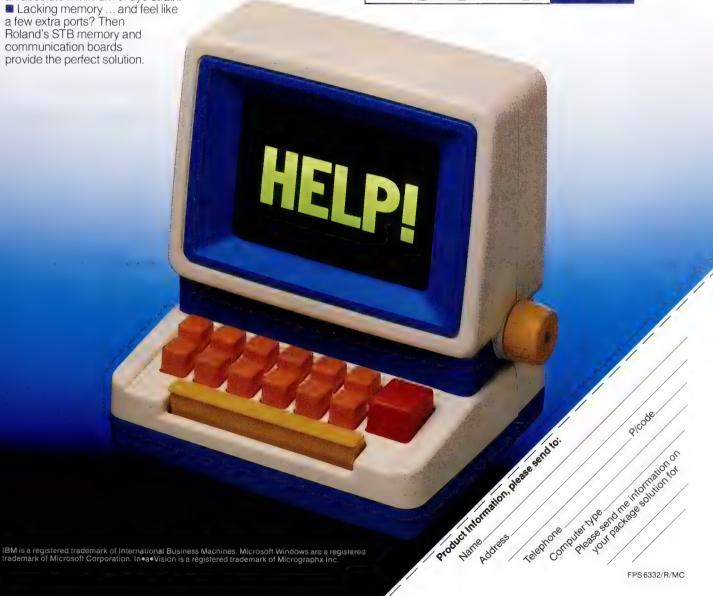
Telephone (03) 241 1254 Facsimile (03) 241 1257

38 Campbell Avenue. Dee Why West, N.S.W. 2099. Telephone (02) 982 8266 Telex 27769 Roland DG New Zealand

9 Nugent Street. Grafton, Auckland 1. Telephone (9) 39 8715 Telex NZ (74) 60518

Roland





text, however, is kept on a different disk.

If you count carefully, you will realise that this involves one more disk than you get on a single-disk machine.

MicroPro's solution is to create a RAM-disk, and keep the text in that. It makes editing faster, they say.

Am I the only person in the world who thinks the company is mad? Guy Kewney

### **Electron-beam** chipmakers move out the lab

American semiconductor companies are starting to plunk down megabucks for commercial equipment that can turn out so-called submicron chips. These integrated circuits have such infinitesimal lines - much thinner than 1 micron, which is about one-hundreth the size of a human hair — that they could not be made outside the laboratory until now. In late September, Motorola took delivery of the first commercial electron-beam system, made by Perkin-Elmer. At least four other US companies, plus a European startup, have also ordered

the \$US3 million machine, which can produce circuit lines down to an ultra tiny1/4 1/4 micron.

Motorola wants the Ebeam system mainly for halfmicron, very-high-speed chips for the US Defence Dept. But it will continue to work on other submicron methods because the output of E-beams may be too low for commercial applications. While an E-beam machine traces circuits one line at a time, techniques such as X-ray lithography would photographically print images covering entire sections of a silicon wafer. Perkin-Elmer, however, claims that the E-beam approach can boost the yield of good chips. In addition, the system can easily make different chips on the same wafer - the reason European Silicon Structures, in Munich, wants one to turn out custom chips.

### **Evading** the issue

Still-puzzled Atari tells me that it 'surprised visitors' to a recent PC Show by announcing the two machines we've been predicting for the past six months - the 2080 STF and the 4160 STF.

Actually, Atari president Sam Tramiel did surprise people when he announced the 'blit' chip, the piece of silicon which was supposed to make the Atari ST look as good as an Amiga.

A blitter moves patterns around in memory. If the memory is onscreen, you get high-speed animation.

The surprise was: a) that it was a lot slower than we thought, multiplying animation sequences around three to six times; and b) that it was only a blitter, without any of the logical operations that make the Amiga's blitter so powerful. Oh, and the other surprise was that you can, after all, plug it into existing machines, despite the firm assurances of Sig Hartmann earlier in the year that you couldn't.

### In for the long term

Among the limitations of traditional disk drives is that they can work only as fast as a mechanical arm can move back and forth to retrieve information. One alternative — the so-called RAM disk, which stores information on random access memory chips - has always fallen short because of high costs, relatively small storage

capacities, and the danger of losing information if power is lost. But now US tapedrive supplier Santa Clara Systems may have solved the problem.

For \$US7.000 its new BATRAM system can move data six times as fast as a hard disk, while storing as much as or more than most disk storage systems for microcomputers. BATRAM uses RAM chips to hold information, and it has a two-week battery to protect stored data in case of a power failure. Thomas Quinn, the company's president says that BATRAM will boost the data processing speeds of local area networks and IBM PCs. BATRAM's price tag is stiff compared with \$U\$1,000 or less for competitive hard disk drives. But Quinn says falling memory-chip prices will make BATRAM competitive by 1988.

### **Coming in** from the cold

No argument, no dispute, no doubts: dBase from Ashton-Tate is a boring product. Boring, but important — and its arrival as a database manager on the Macintosh is doubly so.

Although products like

### SIROMATH SOFTWARE

### INNOVATIVE SOLUTIONS FOR MANAGEMENT INDUSTRY AND RESEARCH

**DATA ANALYSIS** 

Minitab, Genstat

**NUMERICAL ANALYSIS** 

Glim, S, T.S.A.

NAG Library,

FINANCIAL MODELLING MAPPING **DATA BASE** 

- DSS, Aesop

- STARS, MAP - Empress

**CONSULTANTS** in Mathematics statistics, computing, market research and operations research Sydney:

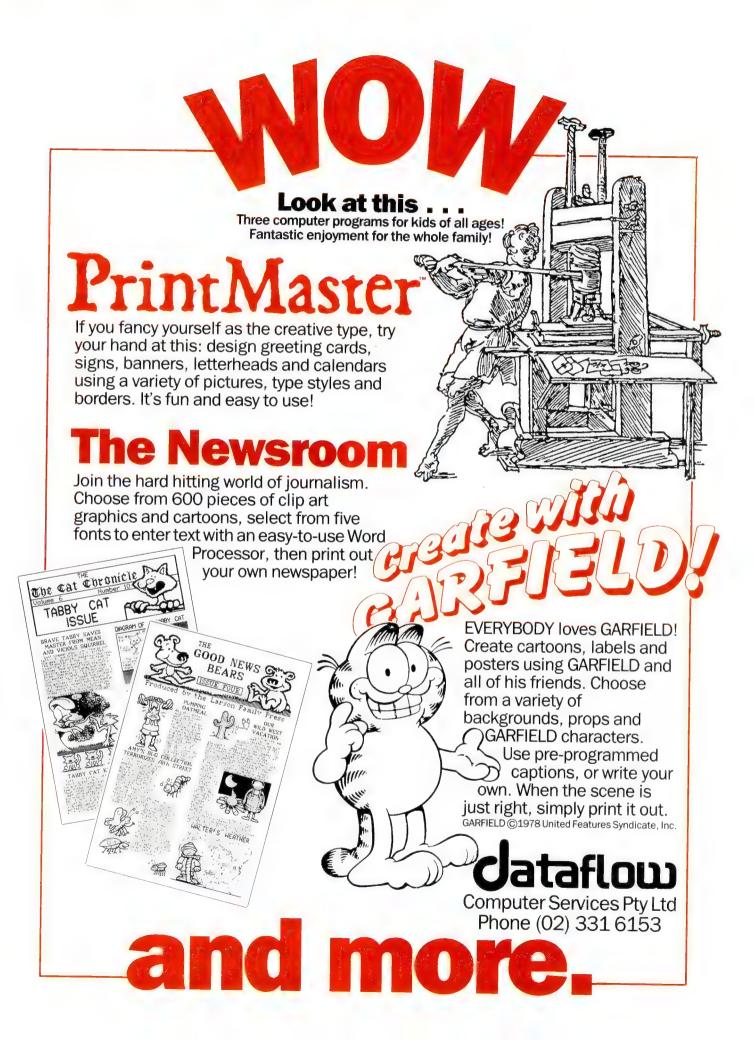
436 0500 Perth:

386 8211

Melbourne:

699 9777 Darwin:

84 5315



# THE ADVANTAGE OF MS-DOS\* COMPUTER

The more powerful a computer, the more it seems to be deskbound.

Not so with the new Microbee/ Mitac Portable PC.

Unlike most MS-DOS computers, you don't need a physique like Charles Atlas to move it from one place to the other.

It weighs in at barely 4.9 kilos.

And, by virtue of a handle, it's also easy to carry.

The keyboard and 5<sup>1</sup>/<sub>4</sub>" disk drive are ingeniously incorporated into one unit, with up to 640K of RAM.

So, whenever you need to take your Microbee/Mitac Portable PC somewhere, all you need is a free hand.

### IT'S COMPATIBLE WITH YOU KNOW WHO.

This new computer opens out to Microbee users the range of IBM<sup>†</sup> PC compatible software.

The Portable PC uses the internationally accepted Phoenix BIOS.

So, unlike some compatibles, this

one is truly compatible.

It also runs on the 3.1 version of MS-DOS, with all the latest additions and enhancements, plus provisions for networking.



EXPANDABLE STORAGE, OF COURSE.

The inbuilt floppy drive can store 360K bytes per diskette.

If that's not enough, however, an optional second 360K byte floppy drive can plug straight into the rear of the case.

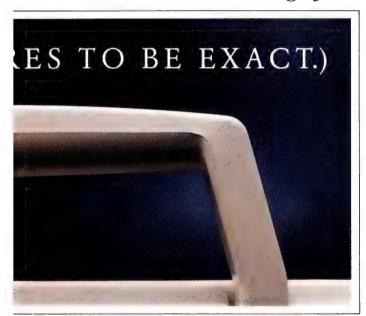
Of course, this isn't essential but it makes for far more convenient

# THE NEW MICROBEE STICKS OUT A MILE.

disk-copying.

It also enables you to run large programmes which require access to expansive data files.

You can also add a 20 Megabyte



hard disk drive when you require large volumes of external storage.

### INBUILT COLOUR GRAPHICS ADAPTOR.

If you already own a Microbee green or amber monochrome monitor, you'll be pleased to hear that it will plug straight in.

But if you desire something a little more impressive, our new computer

has a colour graphics adaptor built in as standard.

### STANDARD ITEMS AND PERIPHERALS.

The Microbee/Mitac Portable PC also includes 2 serial communication ports (not just the one) plus a parallel printer port as standard.

Other standard features include a real-time clock and calendar, with a battery pack.

You'll also find that it's compatible with the range of Microbee peripherals.

So, no matter what use you have for a personal computer, the new Microbee/Mitac Portable PC can (dare we say it) handle it.



Microbee/Mitac Portable PC with 256K RAM — \$1,295 (Monitor not included.)

For more information ring one of the numbers listed below.



Sydney, Ryde 886 4444; Waitara 487 2711; Gosford (043) 24 2711; Canberra (062) 51 5883; Newcastle (049) 61 1090; Melbourne (03) 817 1371; Brisbane (07) 394 3688; Adelaide (08) 212 3299; Perth Nedlands (09) 386 8289

†IBM is a registered trademark of IBM Corporation. \*MS-DOS is a registered trademark of the Microsoft Corporation.

C&MA MBS 0023/R

dBase are described as 'relational databases' in the publicity, what they really are is 'programming languages" specially designed for orthodox file handling.

For all its faults, the dBase programming language has become embedded in computer society, and users of the Macintosh have been, till now, outcasts from that part of society.

John Sculley, ex-Pepsico boss of Apple, added his few words to Ashton-Tate's announcement of the new product which APC will be reviewing in depth in the very near future.

Sculley said: 'Its procedural language could open the door to the development of a broad range of new applications by third parties.'

He means programmers. People who have learned dBase language should be able to take on work for Macintosh owners, now, At least, that will be the official position.

Just how compatible it is, however, will be a matter for long-term consideration. Ashton-Tate says that 'dBase Mac directly accesses IBMcompatible dBase data files.' Well, just about every database and programming language in the world can do that. What they can't do is

run dBase command files.

The new version obviously is changed from IBM versions. It cannot be otherwise: put any program on the Mac, and the very nature of the computer alters the way the code looks. Impossible things become not only possible, but necessary. Large blocks of code become pointless. It may be (conceivably) that dBase programmers will find it too changed to feel at home. On the other hand, it may also be that this product is a vindication of Sculley's determination to get the Mac Plus out.

You do need a Mac Plus for this one - or at the very least, the 800k diskette drive that arrived with the Plus.

Guy Kewney

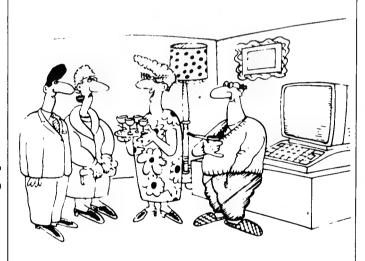
### Desktop publishing: Steve Jobs is seeing it differently now

Apple Computer gave birth to personal computer desktop publishing in January,

1985, when it introduced its Laser-Writer printer. This gave the Mac a unique edge, said Apple founder Steve P. Jobs at the time, because it could do "something no other personal computer can do.'

But now that desktop publishing software is becoming available for IBM's Personal Computer, the former Apple chairman is seeing things differently. "The perception is that desktop publishing is a multibillion market," Jobs told the Sevbold Desktop **Publishing Conference last** 

month. "The reality is that (it) will not be a specific market." Jobs, now president of startup Next Inc, argues that desktop publishing will be so popular that it will become a standard feature on all personal computers within five years. Apple does not disagree. "Desktop publishing is becoming very mainstream," says John M. Scull, Apple's marketing manager for desktop publishing. "But that's not everything the Mac can do. We'll continue to push forward with innovation." [IND]



'Bernard became supreme ruler of the Andromeda galaxy this afternoon.'

### PC PROMISE

- Rated best buy in Databases by 'Which Computer' August 1986. Designed for PC1512. Runs on
- any Compatible.

### THE NEW STANDARD IN RELATIONAL DATABASE MANAGEMENT SYSTEMS

Promise is FAST . . . VERY FAST.

Selects 20 records in 25 seconds.

Promise is compatible with W/star, dBase, Lotus 123

Promise is linked files up to 4 levels deep in relational format.

Promise is Windows & screens. Design your own Link screens. Promise is extremely flexible. Up to 250 fields per record.

Promise is 4 files open at once. Can all be linked together.

Promise is 32000 records in each file. Have many files.

Promise is online help screens. Design your own!

Promise is up to 16 field index and 48 character

Promise is Password protected — 5 levels.

Your eyes only & others.

Promise is colour or mono. 16 colours or shades of grey.

Promise is Menu drive. Design your own. Link together.

Promise is able to add or delete fields without re-writing file.

from

THE PEOPLE-SERVING-PEOPLE MARKETING NETWORK

YOU'RE ON A PROMISE. Send us your \$250 now and try PC Promise. If you are not completely satisfied within 14 days, return the entire package in as new condition and we promise to refund your \$250 less a \$5 handling charge . . . and . . . THAT'S A PROMISE.

	To ANSNET International Pty Ltd (UK & Aust) 49 Riverside Rd. OXENFORD 04210 Phone 075 53 1734 Telex AA43470 COWENS
	Please send copies of PC Promise on IBM 5.25" disc Send information only on PC Promise to:
i	Name: Ph.

Cash/Cheque for \$ enc. Bill my B/card, M/card, Visacard

**NetComm have** ood news f best mo

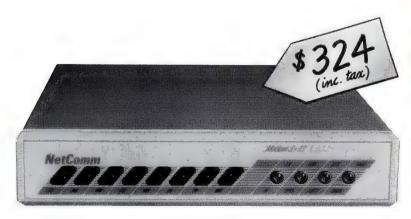
Now Australia's finest modem is within reach of everyone's pocket. NetComm's new Modem 3+12 can be yours for an incredible \$324. This 300 and 1200/75 full duplex manual dial modern will open up a whole new dimension for your computer, allowing you to access most local and overseas data bases and other PC's throughout the world.

Unique Upgrade Facility

Unlike other economy modems which have to be tossed out when you want to upgrade, the NetComm Modem 3+12 can be easily upgraded to incorporate auto dial, auto disconnect and other SmartModem® features.

### All this and Software as well?

The Modem 3+12 comes with a Videotex and Comms program that will enable your PC to directly access Telecom's Viatel, plus news, stock market reports and a host of other information. Now there's no need to compromise on quality or price. See your PC dealer today, or contact NetComm for further information.



### **NetComm**

SmartModem is a registered trademark of NetComm (Aust) Pty Ltd

**Total Solutions for Data Communications** 

NetComm (Aust) Pty Ltd NSW PO Box 284 Pymble NSW 2073 Tel: (02) 888 5533 Telex: 7110712811 + (DNC002 DNCT) Minerva: 07:DNC002 Viatel: 288855330

VICTORIA 94 River Road South Yarra 3141 Tel: (03) 241 0534

QUEENSLAND Suite 6 Level 11 AMP Place 10 Eagle Street Brisbane Tel: (07) 229 7376

NE39FPC .



# Amstrad PC1512

It seems it's not only the Taiwanese who can produce cheap PC clones. Fast, inexpensive and from a company with apparent 'staying power', the Amstrad PC could be just what you're looking for. Guy Kewney loves it.



There's only one clear reason why someone who wants a micro to run IBM software might not want to buy an Amstrad PC1512. It's the same reason why they might not buy an Olivetti M24: the thing will not work with an enhanced graphics adaptor, an EGA. If you don't know what an EGA is, it probably isn't going to bother you, and all you need to know is the price.

For the rest, the PC1512 is one of the most important micros to appear this year.

It's a calculated gamble from Amstrad, designed to go for a new market — the big-business buyers of PCs — with a machine that appeals to their cost-consciousness. It's also designed to steal as few sales as possible from Amstrad's very successful bread-and-butter machine, the PCW8256.

The PC1512 was code-named AIRO. It stands for Amstrad IBM Rip-Off, and that fits, because it's a neat catalogue of what everybody always wanted in an IBM standard box.

It goes faster than the IBM, it's smaller, has better onscreen colours, and includes, as standard, functions which have to be added (and paid for) separately on normal IBM-style machines.

And as you'll be able to pick one up from around \$1450, many people who always wanted a PC can now afford a very nice one.

However, before you skip to the 'Conclusion' section at the end of this Benchtest, it would be as well to pay some attention to the details. This machine is not a conventional PC clone. And perhaps more to the point, so much idle speculation has been wasted on it by people who knew nothing about it, that

the chances are very strong that you have some pre-conceived notions about what it is, and what is in it.

Here, for the first time, are the full facts

In outline, the Amstrad PC is a very fast machine with most IBM PC functions built-in. Its minimal configuration is an Intel 8086 chip, a single 360k disk, 512k of memory, and serial and parallel ports built-in.

The price also includes a paper-white monochrome screen with colour and grey-scale graphics circuitry built into the main board, three expansion slots, a mouse and a keyboard.

Software supplied includes two operating systems: MS-DOS 3.2 and Digital Research's DOS Plus, with the graphics environment driven by GEM, the Digital Research product (graphics environment manager). Also supplied is a new, and very fast and powerful, version of Basic from Locomotive Software, Basic-2. The only applications program supplied is GEM Paint.

Whatever you may have read, however, there is *no* word processing program. There is *no* built-in printer. Sidekick is *not* included. And it does *not* use the V20 processor which runs Intel 8080 code as well as 8088 code.

A colour version of the machine is available, a twin-disk version is available, and a hard disk version is nearly ready, too.

### Hardware

There's nothing astonishing about the appearance of the machine, except the mouse attached. At the front, there's space for two floppy disks, or one floppy and one hard disk, side by side. That

makes the box a bit narrower than most PCs.

There's a choice of colour, or paperwhite monochrome monitor. The mono monitor is very much nicer than a green screen and is a graphics display. Anyone who wants a green, text-only screen will have to buy a standard video card and a standard green monitor, and plug them in separately.

The monitor is purpose-built, with a steep slope down the back to prevent people putting bits of paper up there. Just as well, because the monitor also encloses the main heat generator — the system power supply, exactly as in the first Amstrad home computers. The on/off push-button is on the monitor, at the right back, next to the intensity controls. The advantage of this remote power supply becomes obvious when you come to upgrade.

As there's no mains power in the system box, the EEC laws governing safety don't apply as they do on standard PCs. You can open the box and plug cards in with one hand. EEC rules dictate that you must use two hands if mains power is present.

As a result, Amstrad has been able to put the expansion bus inside at the back, but with a little snap-off lid, so that the normal chore of opening the system to plug in cards is a cinch. On standard PCs, it involves screwdrivers, fingernail chippings, pinched flesh and blasphemy. On the Amstrad, you might have more trouble than you get putting batteries into a Walkman, but that's only because add-in cards are a blessed nuisance to get right. However, there's no obvious reason to plug cards in, because most of the things which people plug into PCs are already there, built into the



This is not a standard, cheap Amstrad bubble keyboard; the keys are mounted in solid plastic with springs

# CUSTOM makes Personal MENU

# ...makes Personal Computers easier to use

custom MENU is an easy-to-use, easy-to-update rapid access menu system specially designed for IBM PCs and compatibles.

CUSTOM MENU's in-built editor lets you write menus that include all of the software used with your Personal Computer/s.

Even the least experienced operator can quickly load programs automatically with just a few keystrokes. There is no longer any need to learn operating system commands or the concepts involved in disk directory structures. CUSTOM MENU replaces all those small batch files you have created to run programs.

CUSTOM MENU is based on a treestructured, page-by-page approach — each menu and sub-menu can be updated at any time

So CUSTOM MENU will handle your future as well as your present needs.

### **CUSTOM MENU**

- An Australian system.
- No-copy protection.
- Suitable for hard or floppy disk.
- Password protection for menu alterations.
- On-screen menu path reminder for multilevel menus.
- Automatic screen blanking if the computer is inactive for 2 minutes.
- Constant display of date and time.
- Selectable colours for the menu display and moving highlight.

NB. A menu item can request entry of specific parameters or options and a listing of your menu structure can be printed.

CUSTOM MENU...simply the fastest, most economical way to make your Personal Computer/s easier to use.





### BENCHTEST

(amazingly small) main circuit board.

At the back are the two sockets which connect to cables from the monitor. One brings power, the other takes the video signal. Next to those are the serial and parallel ports for the modem and the printer (usually).

On the left-hand side of the main box is the socket for the keyboard, half-way back. Next to that is the mouse plug. I would have preferred it to be on the other side — but what the heck. And on the back of the keyboard is a joystick socket.

This joystick, by the way, is not the joystick required by many American games for the PC, but one for future authors to use. Unlike analogue joysticks, this one imitates the computer keyboard.

Next to the joystick is a little volume control. This PC is (astonishly!) the only one which has the ability to make a really audible BEEP! as well as the feebler 'meep!' of the standard machine — and can even be turned down to inaudibility. Don't turn it all the way up, or you'll have a heart attack.

The keyboard opens up by snap fittings, which means that with little effort you can swap keys around. The mechanism of the keyboard is painfully, elegantly simple: two layers of plastic have white circles painted between them. The keys push conductive foil on the top down the fraction of a millimetre needed to connect the top and bottom sheets.

This is not the standard cheap Amstrad bubble keyboard, although it feels very similar. The keys are mounted in solid plastic, with springs. You can type fast and accurately on it. There are a couple of extra keys, which WordStar and Lotus users will like, and other people will probably ignore — a Delete Forward key (generating control-G) and a second Enter key on the numeric keypad.

The keyboard plug is not standard IBM format, and only accepts Amstrad keyboards. Should you require a special-purpose keyboard, one that normally replaces the standard IBM unit, you'll be stuck until when and if someone recognises your need and produces an Amstrad version.

The mouse is fine. It has two buttons, and once Amstrad's version of MS-DOS is loaded, it works like a Microsoft mouse. It worked under PC-DOS with Microsoft's standard IBM mouse drivers, too.

Underneath the monitor, recessed into the main system area, is a socket for ordinary pen-cell batteries to drive a realtime clock. This machine always knows the date and time, and when you last used it. Together with this is a batterypowered memory chip which remembers several important facts about how you like the system to be.

I have to report that, at the time of testing, the colour display was not good, I'm going to assume that, because the engineers at Amstrad noticed the problem, they have been working on it since, and that yellow will show as

'The PC1512 includes very few chips, most of them logic arrays doing the job of 20 IBM board chips. That's why the machine is cheap. The effect of these chips is to imitate all the tricks of the original IBM...'

yellow, not bleached-out white. But don't buy a colour system without having a look at something that shows up these colours. Without the yellow, there isn't much difference between green and blue.

The machine is driven, exactly as in the standard Olivetti M24, by an Intel 8086 running at 8MHz. The difference between the 8088 (in the IBM and exact clones) and the 8086 is the data bus. All programs run identically, but the 8086 is substantially faster. It does require some clever logic to produce a standard IBM expansion bus, but Amstrad has managed this.

The PC1512 includes very few chips, most of them logic arrays doing the job of 20 IBM board chips. That's why the machine is cheap.

The effect of these special chips is to imitate all the tricks of the original IBM. It's an absolute, cast-iron certainty that there are some tricks the designers

didn't know about, and which will make the machine behave differently, in strange circumstances, from the standard IBM.

The trouble with building an expandable system is that you have to decide whether the circuitry on the main board is doing the work, or whether there is something plugged into the bus trying to do the same thing.

Generally, the trick is done electronically by having a switch which can point in one of two directions, and is simple. However, Amstrad has saved some space on its chips by not tristating every circuit on the main board. This does cause one serious problem — it cannot accommodate an enhanced graphics adaptor.

The motherboard of the Amstrad PC produces a 16-colour, grey-scale graphics output. Bright colours are shown correctly on the colour monitor, and as bright grey on the paper-white monitor.

This circuitry is rather nicer than standard IBM colour graphics cards. For most users today, it will exceed their expectations. It isn't as nice as the Olivetti screen, using the standard IBM pixel count, but otherwise, it's pretty good.

There are two reasons why. Firstly, as on the Olivetti, it isn't possible to disable the standard colour graphics output. The system produces the signal and won't stop. And secondly, the 8086, running at 8MHz clock speed, doesn't produce the scan-line timings that the EGA card is looking for on a 4.77MHz 8088 system. Even if you produced a board that didn't have the colour graphics output (only possible on a totally new design) the EGA graphics card still wouldn't work.

When Amstrad designed the machine, there wasn't any good reason to worry about this. The EGA card is slow —

### Technical specifications

CPU: 8086 running at 8MHz, switchable to 4.77MHz

ROM: 32k

Weight:

RAM: 512k expandable to 640k on-board Keyboard: Detachable 83-key, full-stroke keyboard

Mass storage: One 360k, 51/4 in disk drive. Additional hard and floppy

disk model available

Size: System unit: 38.4cms x 37.2cms x 13.5cms; mono

monitor 35cms x 30cms x 31.5cms; colour monitor 37.2cms x 36.5cms x 33cms; keyboard 46.5cms x

16cms x 5.8cms 6.05kg (single disk)

I/O: Three PC expansion slots: mouse port; 25-way RS232

comms port; Centronics printer port

DOS: DOS Plus; MS-DOS 3.2; GEM windowing environment

Bundled software: GEM Paint, Basic-2

Power: 240V A/C

### **BENCHTEST**

pitifully so. Even when working properly, as one disgruntled user recently complained, 'it works as though it's broken.' As little as a year ago, no-one used it, no software addressed it, and it cost a fortune — well over \$3000 if you include the special high-speed scan monitor needed.

These days it suddenly looks different, with the EGA system being the most-installed add-on in the US and booming over here. It's too late for Amstrad to produce a new design, and the current design can't be upgraded. At the price, I suspect that many people who thought they needed EGA suddenly realise that it isn't essential. But if you *must* have an EGA display, you don't buy an Amstrad. It's that simple.

The comms ports are also built-in, but no-one ever gets worked up about replacing these. Add-on cards provide extra comms ports and don't replace the existing circuitry, so the fact that they can't is irrelevant.

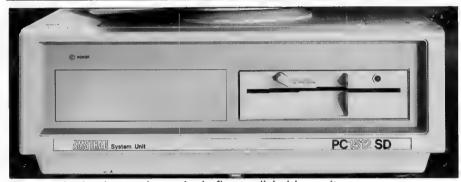
The system has 512k on the motherboard, but the standard Lotus/Intel Extended Memory System has been tested on it, and takes it up to whatever limits the various expansion boards allow. I didn't test it with the AST RAMpage system, however.

Amstrad says that extra chips can be plugged into the motherboard to bring it up to 640k, but this should be done only by Amstrad or one of its dealers. Apparently, it's easy to blow up your new RAM unless you get the motherboard adjustments just right.

A Mountain 20Mbyte drivecard was plugged into the standard bus and worked. So did a Tandon plug-in card, though this had to be installed in the central bus slot. Amstrad assures me that generally, these useful add-ons only fail to work when they rely on a crude software system that does its timing



A 51/4 twin floppy unit is available for an upgrade fee of less than \$585



The standard unit contains a single floppy disk drive unit

based on a 4.77MHz clock. There are very few such add-ons, since many manufacturers these days go faster than the IBM clock.

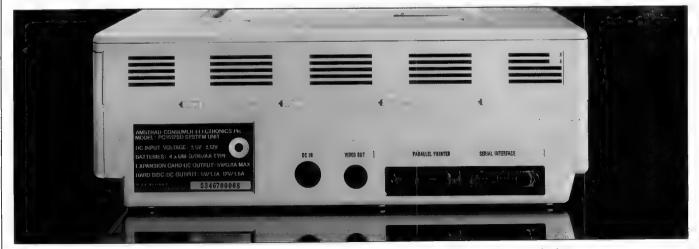
A single floppy; system can be upgraded to a twin floppy for a standard \$585 fee either on-site through a deal between AWA (Amstrad's Australian distributor) and Hills, or by returning the unit to AWA. At press time, upgrade to hard disk was still being priced.

Testing a machine like this on a network is not within the scope of these single-user Benchtests. However, Amstrad assures me that plug-in network cards do work correctly, and

since the company hopes for large sales to corporate customers, I believe that it is taking this requirement seriously.

As indicated above, the keyboard has a non-standard connector and doesn't behave, electrically, as if it were a simple IBM keyboard replacement. I don't know why, but if you need to take a special keyboard used in your company and plug it into your clones, you can't use this one. But then, the same applies to most clones.

As the system comes with GEM, it made sense to supply a mouse. Sensibly, this appears to work in all respects as if it were a normal, bus-mounted Microsoft



From left to right: two sockets for the monitor cables, and the parallel and serial ports respectively

# 101 ways to get a big Christmas bonus.

Every specially marked box of Verbatim DataLife minidisks and microdisks now gives you 101 chances to win a special Christmas bonus from Verbatim.

PURCHASE OF THIS PACK CAN EARN YOU A PACK CAN EARN YOU AND YOU AND

Inside each box is a coupon which offers you:

- A chance to win a \$5,000 Christmas bonus.
- 100 <u>more</u> chances to win a \$100 Christmas bonus.

Every pack you buy between now and the end of the year will give you an additional 101 chances to win the bonus money.

It's just our way

of saying "thank you" for choosing the floppy disks which are certified 100% error free and guaranteed for *at least* a human lifetime.

To order your special Christmas bonus packs, call your Verbatim stockist,

or phone (008) 022 023 for the cost of a local call.

Verballm<sub>®</sub>
Word perfect. For life.

# Peace of mind in three sizes.







### Now Fuji brings you excellence in floppy disks.



There's nothing more frustrating than having a disk go down when it is filled with valuable data. That was our understanding when we first started designing our floppy disks.

We decided to do it right!

The result is a range of products that is so reliable, it carries a lifetime warranty.

The excellence that is relied upon with our photographic products is now available in our range of highest quality disks. Ask for them by name.



#### SELECTED SUPPLIERS

N.S.W. SYDNEY: Contact Computer Supplies 4194908 — A B Office Electronics 9497195 — C A E Electronics 6214242 — Calmer Distributors 698 1999 — The Computer Shop 517 2999 — Intelligence 6993877 — Lamron 808 3666 — Logical Solutions 2126655 — Manily Stationery Supplies 938 2522 — Misua Computer 4517711 — Office World 439 8077 — Pre-Pack Electronics 569 3797 — 1.10 Distributing 9399900 — Thinking Systems 560 6666 — Transcript 764 2177 — The Computer Stationery Co 635 1339 — **OUBBO:** Orana Cash Registers 825833 — **WOLLONGONE:** Altech Electronics 569 3797 — 1.10 Distributing 9399900 — Thinking Systems 560 6666 — Transcript 764 2717 — The Computer Stationery Co 635 1339 — **OUBBO:** Orana Cash Registers 825833 — **WOLLONGONE:** Altech Electronics 7628565 — **BALLARAT.** Ballarat Image Supplies 35 7289 — **GELCONGONE:** Altech Electronics 76285656 — **BALLARAT.** Ballarat Image Supplies 35 7289 — **GELCONGONE:** Altech Electronics 76285656 — **BALLARAT.** Ballarat Image Supplies 35 7289 — **Computer Stationery Systems** Stationery Systems Syste

Trade Enquiries Fujimex a Division of HANIMEX (02) 938 0241

Concord Svd. 1304 B.

### BENCHTEST

mouse. Inevitably, there's the risk that someone has written a program which requires a genuine Microsoft bus mouse with the interrupts changed, but I don't know of one.

### System software

The machine works perfectly well under MS-DOS and PC-DOS. You can use GEM under MS-DOS. As Amstrad has included DOS Plus, a rival system from Digital Research which is mainly designed to imitate MS-DOS, I can only assume that it got it free when it bought GEM from Digital Research. I'm afraid I'm not going to stand up and say how wonderful GEM is. For someone who has never seen a mouse and graphics, it's probably OK, but for someone used to the far more sophisticated and friendly Macintosh WIMP interface, it's a bit of a giggle. However, you do need GEM to run Basic-

There are some advantages to running GEM. The 'desktop' on which programs appear as pieces of code and files appear as pieces of paper, means that you can arrange for files marked .TXT to look for WordStar (say) if someone points at them. But by far the most obvious effect of running GEM is that you suddenly have no memory.

On a 512k machine with Basic-2, plus the GEM fonts plus the operating system plus the clock, calculator and notepad that can pop up from the desktop, with memory for four windows, a request for 64k of data will be met with the discovery that there is only 40k available. On a 640k machine, the printer fonts can be added — and that's your entire memory full. Don't try loading Sidekick.

I feel that GEM will be great for making dumb shop assistants look like skilled salesmen, and I suggest that you quietly put your GEM disks in a safe place until you want to use Basic-2.

Loading GEM for the first time is a long drawn-out nightmare, automated in such a way that I guarantee you get it wrong.

The latest version of Microsoft's operating system has been enhanced on the Amstrad to include the mouse drivers, and the ability to read the real-time clock and system specifications.

With the normal DOS programs, such as FORMAT and CHKDSK, and so on, there's one called NVR.EXE — Non-Volatile RAM executive. This allows you to change: the size of the RAM-disk; the keyboard codes for several keys; the colour and size of the start-up screen; the set-up for the serial port; the joystick buttons; the number of disks; and the

way the mouse moves.

The most important is the RAM-disk. With a single-floppy system, this becomes drive c: (the third drive!) because the first drive is both a: and b: under MS-DOS.

The first thing that the Amstrad PC is set up to do, under both operating systems, when it starts up, is to load a program called COMMAND.COM into RAM-disk.

This is necessary due to the real risk of using a DOS Plus diskette when the system is running MS-DOS, or vice versa. As both versions of COMMAND.-COM have the same name, and because

'... It's an absolute cast-iron certainty that there are some tricks the designers didn't know about, and which will make the machine behave differently, in strange circumstances, from the standard IBM.'

many programs overwrite it during execution and reload it afterwards, an incorrect version of COMMAND.COM 'would tend to be a disappointment to you,' as one systems designer laconically put it.

The RAM-disk is set at 34k at the factory.

All that is by way of saying that the only unusual things about MS-DOS on this machine are the things designed to cope with co-existence with DOS Plus, or the mouse.

There's a neat improvement, too. On this version, if you forget to format a disk with /S (putting system tracks on, so that it can be used to boot up the system) you can add them afterwards. Quite often, surprisingly, you can't on normal MS-DOS systems.

The specially-commissioned version of Basic supplied to Amstrad by Locomotive Software is incredibly fast, and a great deal more powerful than the

standard GW-Basic supplied by Microsoft. Amstrad doesn't provide GW-Basic, but it works OK if you buy it from Microsoft. Just about any version seems to be fine. Unfortunately, the version of Basic-2 provided free with the Amstrad isn't quite as good as the version which Locomotive is selling separately for PC users.

There are two main differences between Microsoft Basic and Locomotive Basic-2 (apart from the fact that Locomotive's version goes at least twice as fast). Firstly, Basic-2 uses GEM (enhanced and improved) to do complex window management, graphics, turtle graphics and mouse controls. And secondly, it's very much more sensible and straightforward in the way it handles disk files and database work.

The full list of Basic keywords is included in the program. The interesting thing to look for is the list of MS-DOS commands — DIR, MKDIR, RMDIR, RD, DELETE, DEL, and so on.

The points of most interest to Basic experts are the file and flow-control commands. Compare them with a list of standard ones, and buy the extra manual available from Amstrad, and you'll be amazed.

I'm not an expert Basic programmer, so I took one along to help analyse its capabilities. She had just written a complex database application in Locomotive's Mallard Basic, as supplied with the PCW8256, which is much more powerful than Microsoft's version, but Basic-2 made her very excited indeed.

### Applications software

Supplied free with the system is GEM Paint. Included in the utilities is a nice little screen-based text editor called RPED, Roland Perry's Editor. It's great for making new batch files, config.sys files, and so on. Frankly. I'd rather have that than Paint, but some people love it (Paint, that is).

**Benchmarks:** The standard GW-Basic Benchmarks ran nearly three times

### In perspective

Unlike many other clone builders, Amstrad is a substantial company and unlikely to disappear overnight. Add the software companies' enthusiasm for low prices and you have a formula for a successful product.

If you are planning to buy an Amstrad PC for business purposes, you must be aware that buying the machine is only part of the story. You may have, quite rightly, saved a few dollars on the purchase price of your hardware and software, but you must remember that staff training (or your own learning), data loading and good old-fashioned mistakes can be time-consuming and costly.

With its range of options spanning paper-white to colour screens, singlefloppy to 20Mbyte hard disk systems, you will be hard pushed to find better value for money.



### It's as easy as 1-2-3!

You and a friend could be spending 22 days exploring 7 of Asia's most colourful and exciting destinations – <u>SINGAPORE</u>, <u>BANGKOK</u>, <u>MANILA</u>, <u>HONG KONG</u>, CHINA, CHIANG MAI and PATTAYA BEACH. *It's as easy as 1-2-3*.

Right now, IBM is offering you up to 12 chances to win a superb Royal Orchid Holiday for two valued at \$5,000.00, with \$1,500.00 spending money. It's easy to enter the IBM Supplies Sweepstakes – all you have to do is order your IBM Supplies from any participating IBM stockist or IBM DIRECT before December 31, 1986. The more IBM Supplies you order, the more chances you'll get to WIN!



Get more details from your office and computer supplies dealer NOW, or call IBM DIRECT and ask for Extension 333: Sydney 20531 • Melbourne 6141511 • Brisbane 229 6711 • Adelaide 212 6899 • Perth 481 3588.

In Hobart, Canberra, Darwin and all other areas, phone STD free (008) 22 2224.

### **BENCHTEST**

faster on the Amstrad PC than on the IBM PC. This doesn't test disk speed, mouse handling or graphics.

Running the tests on the Amstrad, using Locomotive's new Basic-2, the timings shown in the Benchmarks box made the PC1512 look (on paper) faster than a fast PC/AT compatible. It only goes to show how hard it is to prove anything using the traditional Benchmarks. (A new set of Benchmarks has been prepared to test new machines — see the article elsewhere in this issue).

Don't expect the Amstrad PC1512 to run Lotus sorts at five times the speed of a standard PC. To quote a Locomotive spokesman:

'Running the standard Benchmarks on the Amstrad, using standard Basic, gives much the expected results for an 8MHz 8086 machine.

'But it's usual to Benchmark machines using the Basic shipped with the machine. Looking down the list of

Bench	m	ari	S	
		Δn	netra	

	Amstrad	
	PC1512	IBM PC
BM1	0.22	1.5
BM2	0.82	5.2
BM3	2.03	12.1
BM4	2.03	12.6
BM5	2.25	13.6
BM6	4.23	23.5
BM7	7.63	37.4
BM8	6.28	35.0
Average	3.18	17.61

Compare Benchmarks 7 & 8! All timings in seconds. For a full listing of the Benchmark programs, see Endzone. machines so far tested, the only personal computer which comes close to the Amstrad is the Apricot XENi (reviewed last month).

'There should be no confusion about what these results really mean. The APC Basic Benchmarks test a hardware and software combination. The Amstrad PC1512 is a fast machine, and Basic-2 is a fast Basic.'

### Documentation

My pre-production version of the manual wasn't much of a guide to the real thing. Amstrad staff are proud of it, and pointed out various nice features. On the other hand, outside experts tell me that they see the thing as a splendid publishing opportunity, and propose to launch their own, superior products forthwith.

I found it confusing, never really knowing whether a command was for MS-DOS or DOS Plus. There are differences. And I think there ought to be more information on Basic-2.

I'd say that the standard of MS-DOS manual-writing is pretty low, and that this is an unusually good example of the art. That doesn't contradict either point of view.

### **Prices**

It's impossible to give definite prices for this machine as, even by AWA's admission, there's going to be substantial discounts offered by dealers. While the basic machine with single diskette, paper-white monitor, 512k, two operating systems, GEM, a mouse, a keyboard and manuals has a recommended retail price of \$1789, it will certainly



The PC1512 contains very few chips; these imitate the 'tricks' of the IBM

### LOGITECH

MODILLA 0/0/

MODULA-2/86 \$	(ex tax)
Base Language System	139
Base Language System/87	219
Base Language System/512	299
Run-Time Debugger	110
Utilities Pack	89
Sources Pack	159
Window Machine	85
Make Utility	59
ROM Pack	299
Turbo Pascal to Logitech Modula-2/86 Translator!	89
LOGIMOUSE C7	
Base Pack	185
Plus Pack	205
LOGIPAINT Plus Pack	285
LogiCADD Plus Pack	315
Plus Pack with Borlands REFL	EX <b>329</b>

### \*\*CHRISTMAS SPECIAL\*\*

(valid until 31-12-86)

### Holiday Pack:

\$335

Base Language System/87 Run-Time Debugger Utilities

Turbo Translator

To place your order or get more information

CALL NOW ON

(02) 858 5611

### **B.J.E. Enterprises**



35 West Pde Eastwood N.S.W. 2122

Logitech Authorised Distributor

### BENCHTEST

be available for less than \$1500 and possibly less than \$1400. Other recommended retail prices quoted below are likely to be similarly discounted.

A 'standard' PC configuration should be defined as an expandable two-floppy system with serial and parallel cards, a colour graphics card, 512k, a keyboard, a mono display and DOS. Amstrad's rrp is \$2299 and provides as extra: DOS Plus, GEM, GEM Paint, a mouse, a real-time clock, desktop GEM programs, and a central processor running roughly twice as fast as the standard model.

A colour system with one diskette costs \$2255. Both 10 and 20Mb hard disks will be available and will be fitted in Australia. No pricing is available for these yet.

A version of WordStar will be sold with the system for \$199, and a version of the SuperCalc 3 spreadsheet at the same price. The Amstrad PC is scheduled to be released in early December.

### Conclusion

For the life of me, I can't suggest why you'd want any other version of the standard PC, now that this machine is

available. The Amstrad PC's only serious defect is its inability to accept EGA high-resolution graphics cards. And it would be nice to clarify, for potential buyers, the importance of this fact. Unfortunately, there's no way to be sure what the future will bring.

For people who want this, today, the choice is easy — don't buy the Amstrad.

'The Amstrad PC's only serious defect is its inability to accept EGA high-resolution graphics cards. Most of us simply don't need EGA cards — or at least, not yet...'

There are now cheap AT lookalikes on the market at \$3500, including EGA card, screen and 640k. Those machines, with the 80286 chip, clearly will run faster than the Amstrad — and frankly, to run EGA graphics, you really do need a very fast machine.

Most of us simply don't need EGA cards — or at least, not yet, and not for another year or so. There simply isn't any

program which is a big selling essential which *must* have EGA to run, so Amstrad probably won't lose sales.

Do remember that Amstrad is not a charity, however. The company is now convinced that the EGA capability is something it will need one day, and its record on such matters was clearly shown when it launched the CPC6128 and dumped the older CPC664 straight out the window, to cries of rage from users who wouldn't have bought a 664 if they'd realised the 128 was coming, hot on its heels.

That's the only doubt in my mind. The machine is fast, easier to use than any other PC, as cheap as anything with the same specification, and comes from a company now regarded as a good survival bet.

Because the Amstrad PC has a mouse built-in, software will be written for it that uses the mouse. Because it's cheap, cheap software will be sold for it. Because it's expandable, it will sell into areas where Amstrad 8-bit machines won't go. What more could you want?

END

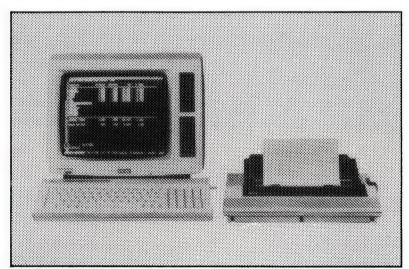


## Output Media

### All your computer requirements

Diskettes
 Magnetic tapes
 Diskette storage

Data cartridges
 Stock computer lables
 Computer forms



# AMSTRAD

personal computers

### **SPECIALS**

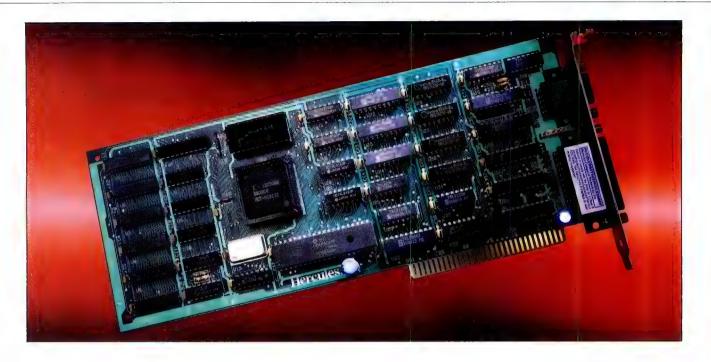
3" Diskettes (suitable for Amstrad)	\$8.70 each \$2.20 each \$19.00 each tor postage
Please charge my Bankcard   Visa   Mastercard   Number   Doorer of diskettes   storage boxes	Expiry date
Signature	
Name	

MELBOURNE (03) 544 4400

28 LIONEL ROAD MT WAVERLEY 3149

SYDNEY (02) 29 5683

360 KENT STREET SYDNEY 2001



### Introducing The Hercules Graphics Card Plus

It's 100% compatible with our original card and costs 40% less. And that's not even the reason to buy one.

The reason is RamFont, an entirely new mode of operation that is unique to the Graphics Card Plus.

The idea for RamFont first occurred to Hercules co-founder and chief engineer Van Suwannukul, two years ago.

At the time he was working with Microsoft engineers on their new word processor, later known as Microsoft Word.

Microsoft's engineers knew that soon there would be very high resolution laser printers offering multiple

typefaces.

They reasoned that if you could print italics and boldface, you should be able to see italics and boldface on the display.

Unfortunately, the Microsoft engineers were ahead of their time.

It was not possible, with the graphics cards that existed at the time, to get both the flexibility to display multiple typefaces, and the speed that is

essential to a word processor.

Van knew that to solve Microsoft's problem, new hardware would be needed.

So he invented RamFont.

#### Word 3 - Three times faster.

Two years later, the Hercules Graphics Card Plus was ready.

What Van had developed was RamFont, an new mode that could store, and then display at lightning speed, 3072 programmable characters.

By this time, Microsoft's engineers had used every trick in the book to speed up Word, and succeeded in making Word 3 considerably faster than earlier versions.

However, for many users it still wasn't fast enough. So you can imagine how delighted Microsoft's engineers were when they saw Word 3 running over three times faster on the Hercules Graphics Card Plus.

At last their word processor could really process.

1-2-3 Release 2 fulfills its promise
At Hercules, we knew that this was just the tip of
the iceberg. RamFont was a revolution waiting to

The more we used it, the more possibilities opened up.

Take 1-2-3 Release 2 for example.

Release 2 has an optional character set that nearly doubles the size of the viewable spreadsheet.

It's a great idea...until you try scrolling up and down or right and left. It takes forever.

As RamFont has the ability to display characters ranging in size from 8 by 4 to 9 by 16, it was easy to adapt Release 2's smaller characters.



VAN SUWANUKUL AND KEVIN JENKINS, CO-FOUNDERS HERCULES

The result is that now you can scroll a far larger spreadsheet as fast as version 1A could scroll a smaller one.

Then another idea occurred to us.

If RamFont could be programmed to display

characters, why couldn't it be programmed to display graphics?

Well, it turned out it could.
So we did a bit more work
and now you can draw 1-2-3
graphs in a window on top of
your spreadsheet, and view your
data in the background.

(Or, you can still view a graph on a full screen if you prefer.)

We liked what RamFont did for Word and 1-2-3 so much we did the same thing for Symphony and Framework.

Can a graphics card be a work of art?

Van will tell you that the Hercules Graphics Card Plus is the best monochrome graphics card he's ever designed.

Which is significant because 1) Van is not given to exaggeration, and 2) his three previous designs have met with a certain degree of success.

What makes the Graphics Card Plus so good is a chip Van designed called the V112.

The V112 does three things.

First, it runs every single one of the thousands of programs written for the IBM Monochrome Display/Printer Adapter.

Second, it runs every single program written for the famous Hercules  $720\times348$  graphics standard.

And third, it makes RamFont possible.

#### Survival of the fittest

Actually, chips like the V112 do something else. They make our products even more reliable.

One chip manufacturer was astonished when we told him that we test 100% of the nodes on a chip. He said 93% was common.

By testing each chip individually to



such high specifications, we are able to weed out weak V112s before they go to assembly.

Then we subject the survivors to more testing at temperatures above 70°C, weeding out whatever weaklings are left.

V112

After the V112 has been

thoroughly tested, we insert it into a fully assembled Graphics Card Plus. (Incidentally, all our PC boards are 100% tested, which is another rarity.)

Then batches of the finished product are heated in ovens to greater temperatures than you are ever likely to encounter. While still hot, the Graphics Card Plus is placed in a PC just like the one you use, and we run special software that exhaustively tests all functions.

Then, as a final precaution, each tested unit is carefully placed in an anti-static bag to protect it during shipment.

Free software, and parallel ports.

Hercules has become famous for the software we include with each monochrome graphics card.

And the Graphics Card Plus has the best software vet.

You get a program to extend the life of your monitor.

And to print graphics.

Then Fontman, a program that makes it easy to create your own RamFont characters.

Plus 25 fonts to get you started.

Plus everything you need to run 1-2-3 Release 2, Microsoft Word 3, Symphony 1.1, and Framework II.

And the
Graphics Card Plus comes with
a parallel printer port that you can
disable. (Some PC compatibles require this.)

What price perfection?

\$595ex.tax

With the RamFont breakthrough, 100% compatibility with our original card, free software, a parallel printer port, and the Hercules Graphics Card Plus should cost at least \$1200.

Surprise. Its suggested list price is only \$595 ex. tax.

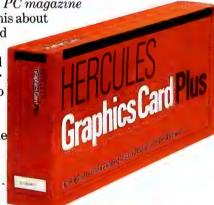
If you think that the Graphics Card Plus must be the ultimate monochrome card, you're not alone.

John Dvorak, PC magazine columnist, said this about the Graphics Card Plus:

"If you intend to buy an IBM or clone and want to

to buy an IBM or clone and want to run a monochrome system, this is the card to get. I wouldn't even think about anything else."

Neither would we.



Hercules.
We're strong on graphics.
TECH PACIFIC

ARCOM PACIFIC BOX 13, CLAYFIELD BRISBANE, QUEENSLAND BRISBANE: (07) 52 9522 SYDNEY: (02) 957 4678 MELBOURNE: (03) 51 9446

TECH PACIFIC
7 BANK STREET
SOUTH MELBOURNE,
VICTORIA 3205
MELBOURNE: (03) 690 9055
SYDNEY: (02) 319 2622

Trademarks/Owners:IBM/IBM; Lotus, 1-2-3,
Symphony/Lotus; Microsoft; Framework II/Ashton-Tate; Hercules, RamFont, Font Man/Hercules.



# Macintosh?

'Word' and 'Full Paint' are stunning examples of why the Macintosh has become the peoples' favourite.

Writing a letter or a complex report is delightfully simple with Microsoft 'Word' and an Apple Macintosh.

And with your new Mac running 'Full Paint', you'll have a graphics capability second to none.

'Word' and 'Full Paint' are worth \$613, but they're free to you when you invest in a new Macintosh this month. But don't delay. Call us now on (03) 791 2900 for more information.



AdShop/Rob 143



# Business graphics

Presenting your business information in graphic form may be just the boost your company needs, and you don't have to be a great artist to do so either. Nick Walker takes a look at what's available and puts you in the picture.

To the uninitiated, the screen of a micro running a spreadsheet is a perfect example of everything that's wrong with computers — rows and rows of seemingly meaningless figures. To you those figures may indicate the most significant discovery in your company's history, but, unless presented in a meaningful form, they may as well be a hex dump of RAM.

Many modern spreadsheets, such as Lotus 1-2-3, contain a facility for showing a set of figures as a graph. Graphs are fine for showing a colleague your discoveries, but are not generally of presentation quality. For some time now there have been packages available that take the data from the likes of 1-2-3 and turn it into much higher quality graphs. The quality of these products has steadily improved over the last two years, so much so that I decided that the time was right to examine the most promising of the current crop.

To assist me in my choice I set some criteria to which all the packages had to conform. Firstly, they had to run on an IBM PC or compatible. (I didn't really want to stipulate this, but it is the machine that both small and large businesses most commonly use when running spreadsheets). Secondly, they had to be able to display graphs in both CGA mode (colour graphic adaptor) and one of the higher graphics modes such as EGA (enhanced graphics adaptor) or Hercules.

CGA is by far the most common colour graphics standard used with the IBM PC, but its low resolution and lack of colours pose problems to anyone trying to produce decent graphics. EGA is IBM's attempt to produce a higher quality colour graphics standard, which despite

its high price (if bought from IBM) seems well on the way to becoming the second IBM colour standard. Hercules is by far the most successful third party, high-resolution monochrome for the PC.

Two final criteria I expect from a decent IBM graphics package are that it must be able to take data from a Lotus 1-2-3 spreadsheet and be capable of producing a good quality hard copy of what's shown on the screen. A surprising number of the older packages don't support peripherals capable of high quality graphical output.

You may think that there would be few packages that satisfied such a specification, but I discovered well over 20. I picked two, both relatively new packages to the market and each with a very different approach to the creation of graphics. Those selected for review were 'Harvard', a full-blown presentation system from Software Publishing Corporation and Perspective from Three D Graphics, a package whose forte is three-dimensional graphics.

Obtaining the necessary hardware for this review was no great problem, except for one thing — an EGA colour display. No end of manufacturers and distributors offered me plug-in expansion cards which provide EGA output, but no-one seemed to have a suitable colour display. Finally, after much searching, I was able to obtain a genuine IBM one.

Harvard Presentation Graphics

To install Harvard you need a 256k RAM system with two floppies or one hard

disk, version 2.0 (or greater) of the MS-DOS operating system, an 80-column monitor and either a CGA, EGA, Hercules or IBM monochrome display card (although you can't see the graphs on the screen with the IBM mono set-up). The installation process is executed via a batch program called 'INSTALL'. Once installed it is impossible to load the program on another system until it is deinstalled; a nicer form of copy protection than the key-disk system but still not perfect.

When you first start Harvard, it displays a main menu from which you select each of the program's major functions. Unlike most graphing packages that have a general data entry screen, Harvard has a different data entry screen for each of its graph types.

A pie chart is the easiest graph to create with Harvard, although this has much to do with pie charts being used to graph only one set of variables rather than being an easy-to-use feature of the package. To get to the pie data form, you select 'Create graph' from the main menu and then 'Pie' from a second menu. The menu structure is the same throughout the package, so I won't bore you with the details.

For some reason, with graphing programs, I find a menu system far less irritating than with other programs, even with repetitive use. The data entry form lets you enter the graph title, subtitle, footnote and, for each segment of your graph, a value and label. A number of options can be applied to enhance the pie chart's appearance, including showing a slice as a cut-out for extra emphasis, changing the colour or fill style of each slice, adding percentage or currency signs and creating a three-dimension

### **SCREENTEST**



Harvard's annotation screen

effect. Two pie charts can be displayed on the screen and one can be linked so as to show a breakdown of a single segment. Finally, if you desire, pie chartstyle data can be shown as a single broken-down column. A particularly effective combination image wise is a pie chart together with a column on the same screen.

Line and bar charts add another dimension to the type and amount of data that you can handle. Before entering the data input form, a window will appear requesting information about the x-axis, specifically the units (that is, name, day, week, month, year, time, number and others), the start value, the end value and the increment. The data entry screen will then be suitably customised and ready for the entry of y-axis data. Up to eight series of data can be displayed on a single chart with up to 60 values per series, although it is obviously wise to keep the number low if you want an easily understandable graph.

There are so many customised options available for these types of graph that Harvard has broken them down into three pages of options. These pages of options are filled in just like the data entry forms.

From page one you can change the title, subtitle or footnote. You can also type a title for the X and Y axes. In the table at the bottom of the screen you can change the legends of each series in the graph, select the graph type (bar, line, trend, curve and point) and specify if you want the graph sorted or cumulative.

From page two you choose overlapped bars, stacked or 100 per cent bars or lines. You also select the type of grid lines (if any), a label for the values shown along the Y-axis, the style of the frame and the placement and justification of legends. For bar charts, you can specify that Harvard displays the bars with a three-dimensional appearance or with values above the bars. You can also indicate whether the bars are to run horizontally or vertically.

Finally, on page three, you can choose the colour of the lines or bars, the marker



An organisational chart

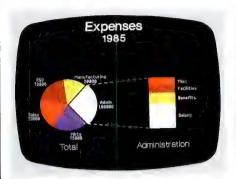
style for line or point chart, the pattern for bar charts, and the line style for any of the variations of line charts.

Two other types of graph are available from the 'Create New chart' sub-menu. These are the area chart — a cross between a line graph and a stacked bar — and the high/low/close graph used almost exclusively to show the high point, low point and closing price of stocks and shares. These graphs are really variations on the bar/line graph theme and use limited forms of the bar/line graph data entry screens.

Harvard Presentation Graphics, however, is more than just a graphing program; it is an attempt to provide everything you need to make a complete presentation. A substantial proportion of the program is concerned with other aspects of creating a presentation. There are facilities for the creation of many types of text chart. Among these are hierarchical charts, which are used to show company structure; and bullet lists, which give visual impact to a list and tabular charts.

One of the most useful features of Harvard is its annotation facility. This takes any chart created with Harvard and loads it into the window of an annotation screen. A graphical menu of the tools available to add the finishing touches to the graph is shown on the right-hand side of the screen. From this menu you can add extra text, draw lines, position arrows, draw boxes, copy any part of the graph and remove any part of the graph. (Users of MacPaint or similar painting packages will feel quickly at ease with the operation of the annotation screen, as Harvard is based on the same principles).

Harvard will import and export to a number of different commercial packages. From Lotus 1-2-3 and Symphony you can import a worksheet directly into a data entry screen and you can import a Lotus 1-2-3 or Symphony graph directly into its much improved Harvard equivalent. For other applications the data has to be in the form of an ASCII file, and the procedure



A pie and column chart

is considerably more complex. A graph generated by Harvard can be exported but only to one particular package, the word processor PFS:WRITE.

The choice of output devices for your finished graph is the most impressive list I've ever seen for a single package, and consists of around 30 printers including a number of laser printers, 12 plotters and four colour slide peripherals. The chances are that even if your printer is not listed it will behave like one of those listed; if not, considerable information is included in the manual for those who feel confident enough to design their own printer driver.

The documentation consists of one excellent 200-page manual which is well written, easy to understand and well illustrated. It is also one of the few manuals which successfully combines tutorial and reference information in one book.

### Perspective

It was only half-way through the review of Perspective that I realised that it didn't conform to the criteria I had specified. Perspective will not run on a CGA-driven monitor; the manual fails to mention this, and I foolishly assumed, as I happily worked away on both EGA and Hercules set-ups, that this popular standard was supported.

Also, the existing version does not produce colour graphics. This, along with several other features including greater control over annotations, scaling and maths capability are promised in a future version which is "due shortly" according to Three D Graphics.

By the time I realised that CGA wasn't supported, I was so impressed with what Perspective could do that I felt I had to review it anyway. I suspect that there was no way that Perspective's programmers could get anywhere near the standard of graphics they wanted from CGA — even so it's a serious omission. The other hardware requirements needed to run Perspective are an IBM or compatible with 512k RAM, DOS

## Where else can you buy top quality 51/4" disks at these prices?



Now you can buy absolute top quality disks that are also the cheapest in Australia!! We've sold over 300,000 of these Microdot disks and so far not one single complaint! They also come with a 5 year guarantee, which indicates the quality and our faith in the Microdot disks. Now for the price. We believe these prices to be the cheapest in Australia. So why pay 2-3 times the price for the same quality as Microdot?

### CHECK THESE PRICES!

DESCRIPTION

1-9 BOXES

S/S D/D

\$17.95

## ESS FOR "NO FRILLS" DISKS!

Bulked packed, Microdot D/S D/D without boxes, or labels, or brand name, just their white card jacket! 1-99 DISKS 100+DISKS 1,000+DISKS

\$16.95 (PER 10 DISKS)

15.95 PER 10 DISKS)

\$14.95

(PER 10 DISKS)

(TAX EXEMPT PRICES LESS 20¢ PER DISK)

**RETAIL INQUIRIES:** Rod Irving Electronics,

MELBOURNE, 48 A'Beckett St. Phone (03) 663 6151 NORTHCOTE 425 High St. Phone (03) 489 8866

MAIL ORDER: (03) 543 7877 or P.O. Box 620, CLAYTON 3168

WHOLESALE INQUIRIES: Ritronics Wholesale, 56 Renver Rd. CLAYTON 3168. Phone (03) 543 2166.

## Connectors, Adaptors and Cables Galore at Rod Irving Electronics!



#### COMPUTER LEADS

- CL2
   9 pin 'D' plug to 9 pin 'D' plug
   All pins wired straight through (removable terminals)
   Length 1.5 metres

  \$14
- Cat P19033

EB

Œ

ш

 $\alpha$ 

- CL3
   9 pin 'D' plug to 9 pin 'D' plug
   All pins wired straight through
  (removable terminals)
   Length 3 metres
  Cat. P19035
  \$17

- CL5
   9 pin 'D' plug to 9 pin 'D' socket All pins wired straight through (removable terminals)
   Length 3 metres
- Cat. P19036

Ш

- CL7
   15 pin 'D' plug to 15 pin 'D' plug
   All pins wired straight through
  (removable terminals)
   Length 3 metres

  \$24.9
- Cat. P19016
- 15 pin 'D' plug to 15 pin 'D' socket All pins wired straight through (removable terminals)
- Cat P19017 \$27.95

•Length 3 metres

- CL10
   25 pin 'D' plug to 25 pin 'D' plug
   Pins 1 through to 8 and 20 wired straight through (removable terminals)

- 25 pin 'D' plug to 25 pin 'D' plug
   Pins 1 through to 8 and 20 wired straight through
   (removable terminals)
- Length 3 metres
- Cat. P19009 \$23.50

- CL12

  25 pin 'D' plug to 25 pin 'D' plug

  Pins 1 through to 8 and 20 wired straight through (removable terminals)

  Length 7.5 metres
- Cat. P19037 \$25.95

- CL13
   25 pin 'D' plug to 25 pin 'D' socket
   Pins 1 through to 8 and 20 wired
  straight through
  (removable terminals)
- ●Length 3 metres \$29.95

## CL21 • 25 pin 'D' plug to 25 pin 'D' plug • All pins wired straight through (removable terminals) • Length 1.5 metres Cat P19007 \$33.95 \$33.95

- CL22
   25 pin 'D' plug to 25 pin 'D' plug
   All pins wired straight through (removable terminals)
   Length 3 metres
- Cat. P19008

- CL23

   25 pin 'D' plug to 25 pin 'D' socket
   All pins wired straight through (removable terminals)
   Length 3 metres
- Cat. P19012

- 36 pin Centronics plug to 36 pin Centronics plug
   All pins wired straight through
   Length 2.13 metres \$49.95

#### Cat. P19014

CL27
• Apple II, IIe, II+, with parallel

- Dual 10 pin (20 contacts) connector to Centronics 36 pin plug
- Length 2.4 metres
   Cat. P19025 \$29.95

- CL28
   Apple III with universal parallel
- Interface card

  Dual 10 pin (20 contacts) on Apple end to Centronics 36 pin plug

  Length 2.4 metres

  Cat. P19026

  \$29.95

- CL30
   Tandy II/12/16/16B/2000, with dual

- CL31
  Tandy I/III/4/4P, with 34 pin edge
- Cat. P19028
- Cat. P19029





DB CONNECTORS				
Cat. No.	. Description	Price		
P10880	DE9P Male	\$1.95		
P10881	DE9S Female	\$2.25		
P10882	DE9C Cover	\$1.20		
P10884	DE9P R.A. Plug	\$3.65		
P10885	DE9S R.A. Skt	\$4.25		
P10890	DA15P Male	\$2.10		

- 17 pin female on computer end to Centronics 36 pin plug (Equivalent to 26-1323)

   Length 2.4 metres

  Cat. P19027

  \$33.95 P10901 DB25S Female \$2.95 \$1.25 P10902 DB25C Cover ...

## P10904 DB25P R.A. Plug \$4.50 P10905 DB25S R.A. Skt \$5.95

- connector on computer end to Centronics 36 pin plug. (Equivalent to 26-1401) Length 2 4 metres
- CL33

   IBM PC, XT and look-a-likes with 25 pia 'D' plug on computer end to Centronics 36 pin plug.

  ■Length 2.13 metres



	<b>DB CONNECTORS</b>
Price	Cat. No. Description
. \$1.95	P10880 DE9P Male
\$2.25	P10881 DE9S Female
\$1.20	P10882 DE9C Cover
\$3.65	P10884 DE9P R.A. Plug
\$4.25	P10885 DE9S R.A. Skt
\$2,10	P10890 DA15P Male
	P10891 DA15S Female .
\$1.25	P10892 DA15C Cover
	P10894 DA15P R.A. Plug
	P10895 DA15S R.A. Skt
	P10900 DR25P Male



## TELEPHONE

\$10.95

EXTENSION CABLE

US plug to 2 US sockets

Length 10 metres

Cream colour cable



5m\$12.50



Cat Y16010

#### TELECOMMUNICATIONS AUSTRALIAN STYLE





48 A'Beckett St, MELBOURNE Phone (03) 663 6151 425 High St. NORTHCOTE Phone (03) 489 8866

Mail Order and Correspondence P.O. Box 620, CLAYTON 3168 Telex. AA 151938



## MAIL ORDER HOTLINE

POSTAGE RATES.

Certified Post for orders over Detrified Post for orders over \$100 included free! Registered Post for orders over \$200 included free!







FREE POSTAGE FOR ORDERS OVER \$75 & UNDER 3kg!!

## FREE POSTAGE FOR ORDERS OVER \$75 & UNDER 3kg!!



Stylish, swiver base monitor, available in amber or green.

Green Cat. X14506 Normally \$235 er Cat. X14508 Normally \$239 SPECIAL, ONLY \$199



## CENTRONICS GENDER CHANGER

 Female to Female
 Saves modifying or replacing non-mating Centronics cables.
 All 36 pins wired straight through. Cat. X15662

t. X15662 ..... Normally \$33.95 SPECIAL, ONLY \$24.95



#### RS232 GENDER CHANGERS

Saves modifying or replacing non-mating RS232 cables by changing from male to female to male. All 25 pins wired straight through

male adaptor to join 2 female ends Cat. X15650 ...... Normally \$19.95 Female adaptor to join 2 male ends Cat. X15652 ..... Normally \$19.95 SPECIAL, ONLY \$17.95ea



#### **RS232 INLINE** SWITCHING BOY

#### RS232 SURGE PROTECTOR

- Avoids costly damage from large voltage peaks caused by lightning or other power problems
  Uses metal oxide varistors (M.O.V.) to suppress any voltage above 260 on pins 2,3 and 7.

  Will handle up to 1 Joule and 250A peak current.

Cat. X15660 ... lectronics



#### **RS232 MINI TESTER**

- Male to female connections

SPECIAL, ONLY \$32.95



Durable, accurate and reliable, and with dual fire buttons, these new trackballs are suitable for use with the Commodore VIC-20. Atan home video game, Atan 400 and 800 home computer and Sears Arcade Game.

Cat. C14225 ....



#### TTL MONITORS

Fantastic resolution! Enjoy a crisp sharp image with the latest Ritron TTL monitor! IBM\* compatible, green display, swivel and tilt base

Green Cat. X14510 Normally \$289 Amber Cat. X14512 Normally \$289 SPECIAL, ONLY \$269



#### **RS232 MINI PATCH BOX**

- Interface RS232 devices
   With male to female 25 pin inputs
- 25 leads with tinned end supplied
   Complete with instructions
- Cat. X15654 Normally \$25.95

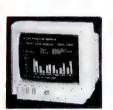
SPECIAL, ONLY \$21.95



- Male to female connections
   Pins 2 and 3 reversed
   All 25 pins connected

Cat. X15658 \$22.95 SPECIAL, ONLY \$19.95

Irving E



INTRA RGB COLOUR MONITOR!

COLOUR MUNITURES
Size: 14 nnch
Sync. Horiz. Scan Freq: 15.75 KHz
Sync. Vert. Scan Freq: 50 Hz
Band width: 18 MHz
Dot Pittch: 31 mm
Besolution: 640 x 200 dots
Display Format: 80 x 25 Characters
Display Colours: 16 colours

only \$695



#### SWIVEL BASE

Ш

Make life easier with these quality, swivel and tilt bases, complete with rubber fittings! only \$24.95 Cat. D11100 ......



### TELECOMMUNICATION PLUG TO 2 SOCKETS.

Ideal for modern connections Cat. Y16014 ...



#### IC STORAGE CASE

Electro static charge proof plastic IC case with conductive sponge Dimensions 75 x 130 x 19mm Cat H10095 NORMALLY \$8.95 SPECIAL, ONLY \$7.95



TEXTOOL SUCKETS			
P17016 16 pin	\$14.50		
P17024 24 pin	\$14.50		
P17028 28 pin	\$19.50		
P17040 40 pin	\$22.50		



#### IC SPECIALS

Cat. U21614 Normally \$49.50 Save \$20, SPECIAL \$24.95 MEL9501

Have you blown up your Apple drive by plugging it in backwards or not turning off the power while changing bauds? We have the MEL9501 chip! SPECIAL, ONLY \$29.95



## SPEECH SYNTHESISER CHIPS!

SPO256A-AL2: Speech synthesiser chip, needs programming to work. \$16.95

CTS256-AL2: Contains the code recognition circuit to enable the project to plug directly on the printer port, or into an IBM PC \$29.95

A SET OF EACH . \$44.95



#### IC INSERTERS

14-16 pin T12187 \$8.95 \$9.95 18-20 pin T12189 24-28 pin T12191 36-40 pin T12193



#### APPLE COMPATIBLE CARDS!

#### PRINTER CARD

"Grappler" style card allows hi-resolution screen dumps to your Epson compatible printers. Fully functioned for flexible flow of output

functioned for flexible flow of output

Cat. X17029

80 COLUMN CARD

Ideal for use with CP/M Your
computer becomes capable of
upper and lower case, with a full
width screen of 80 characters: If you
want to run Wordstar, or any good
wordprocessing software, get this
card \$85

#### Cat. X17019 SPEECH CARD

Simple to use, software controlled speech synthesiser kit. Complete with demonstration programs and text to speech software Impress your friends with your talking Apple!

Cat. X17009 \$69 Cat. X17009

Three channel synthesiser can create a single polyphonic output or three monophonic outputs. Control of pitch and volume is possible. Up to three cards can be used at the one time. Complete with demonstration software

Cat. X17011 RGB CARD

True high definition colour for your Apple or compatible Cat X17039 \$79

#### PAL COLOUR CARD

Get some colour into your games
Use your Apple or compatible on the
second television. Has both UHF
and composite video outputs. Fully
adjustable so you can fine tune if you
a crisp clean image

#### Cat. X17025 SUPER SERIAL CARD \$95

No card does it better Want to hook in to bulletin boards or mainframes? Turn your computer into a dumb terminal. That's right! This serial card comes complete with software \$129

APPLE IIe CUMPATIBLE CARDS



#### IBM\* XT COMPATIBLE CARDS

NEW TURBO CARD! Make your XT work as fast as an AT! (Up to 9 times faster) Cat. X \$995

5499

Enhanced Graphics Card Cat X 

640K Main Board Cat X18020 ...... Turbo Mainboard Cat. X18030 ......

Mono Graphic Printer Card Cat X

Colour Graphic Display Card Cal. X ......\$129

Floppy Disk Controller Card (2 drive capability) Cat X18005 ...... \$79 Floppy Disk Controller Card (4 drive capability) Cat X \$99

Parallel Printer Card Cat. X18017 ..... \$37.50 RS232 Card Cat X18026 \$59.50

Clock Card Cat. X \$59.50 Games Adaptor Card (2 joystick ports.) Cat X

Hard Disk Drive Card Cat. X



#### JOYSTICK FOR IBM

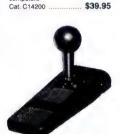
Features Selectable "Spring centering" or "free floating". Electrical trim adjustments on both axis 360 degree cursor control

\$49.95



#### APPLE JOYSTICKS

Ideal for games or word processing. Fits most 6502 "compatible" computers



#### **DELUXE JOYSTICK**

Suits Commodore 64, VIC-20, Atari, Sears, NEC PC-6001 computers or \$14.95

NEW!! NETWORK CARDS

Complete with software. Also runs PC-NET<sup>R</sup> 1M/Bit per second data

transfer rate via 2 wire link

TELEPHONE CURL CORD

Cat. Y16023

\$695

U.S. plug to U.S. plug
Replacement hand set cord
Length 4.5 metres

\$7.95

FREE POSTAGE FOR ORDERS OVER \$75 & UNDER 3kg!!



**CANON A-40 PRINTER** 

Serial Impact Dot Matrix

140 C.P.S

Near Letter Quality Mode

1.4K Buffer

**RS232 DATA SWITCH** 

WITH TESTER

2 Sp in RS232 "D" connectors 2 in, 1 out or 1 in, 2 out.
I deal for 2 computers to one peripheral or 1 computer to 2 peripherals
No power required
Six dual coloured LED indicators showing certain flow status:
T.D. Transmit Data
R.I. Sequest To Send
C.T.S. Clear To Send
D.S.R. Data Set Ready
D.T.R. Data Terminal Heady
Housed in heavy duty metal cabinet.

cabinet.
Size: 200(W)x68(H)x150(D)mm

Solution
 Solution

PRINTER LEAD FOR IRM 

Length 2 metres at. P19029 ....... R.R.P. \$44.95 SPECIAL, ONLY \$19.95

CENTRONICS DATA

Cat. X19115 ..... Norm SPECIAL, ONLY

X19110 ...... Normally \$149 SPECIAL, ONLY \$119

Normally \$169 NLY \$129

Cat. X19110

Cat. C20040



STORAGE
If you've got lots disks, you'll
appreciate the extra capacity of this
disk storage unit when it comes to
locating "that" disk!
Features...
100 disk capacity
Smoked plastic cover
Lockable (2 keys supplied)
9 Dividers/spacers
Cat 118027
101 \$24.95

Cat. C16027 ...... only \$24.95

51/4" DISK STORAGE Efficient and practical. Protect your disks from being damaged or lost! Features...

Cat. C16025 ...... only \$24.95

51/4" DISK STORAGE
Efficient and practical. Protect your disks from being damaged or lost!
Features...
• 50 disk capacity
• Smoked plastic cover
• Lockable (2 keys supplied)
• Dividers/spacers

Cat. C16030 ...... only \$19.95

31/5" DISK STORAGE LINIT

Features...

■ 70 disk capacity

■ Smoked plastic cover Lockable (2 keys supplied) Dividers/spacers





## **FLOPPY DISKS GALORE!**

All prices per 10 disk boxe
Our Cat. Product's Description
Number Code Description

C12600 3012-3000 S/S ......DEX 31/2" DISKS \$55.95 \$53.95 Normally \$75.00) \$79.95 \$75.95 (Normally \$109) C12602 3022-3000 D/S

XIDEX 51/4" DISKS C12410 5022-1000 D/S D/D 40 track

...\$29.95 \$28.95 (Normally \$37.50) ...\$38.95 \$36.95 (Normally \$47.50) C12610 MF350 S/S D/D 80 tracks/135 TPI ......\$54.95 \$52.95 C12612 MF360 D/S D/D 80 tracks/135 TPI ......\$59.95 \$55.95

VERBATIM 51/4" DATALII C12501 MD525-01 S/S D/D soft sector 40 track C12504 MD550-01 D/S D/D ...... C12505 MD550-10 D/S D/D 10 sectors 40 tracks C12507 MD577-01 S/S D/D soft sectors 80 tracks C12510 MD557-01 D/S D/D soft sectors 80 tracks

 VERBATIM 5 1/4"
 VALULIFE
 DISKS

 C12421
 S/S D/D
 \$22.95
 \$21.95

 C12421
 D/S D/D
 \$29.95
 \$29.95
 \$26.95

VERBATIM HIGH DENSITY 51/4" DISKS C12520 MD/HD D/S H/D soft sector \$99.95 \$89.95 nally \$109.95)

VERBATIM 8" DISKS C12811 DD34-4001 D/S D/D C12814 DD34-4026 D/S D/D

HEAD CLEANER DISKS 14 95 \$12.95 \$12.95 \$12.95



### MICRODOT DISKS

100% certified and error free guaranteed! Where else can you get 100% guaranteed disks at these prices?!

1-9 boxes 10+boxes

51/4" S/S (C12440) \$14.95 \$13.95 51/4" D/S (C12445) \$18.95 \$17.95

SPECIAL OFFER!

During November, Double Sided Microdot Disks 20 boxes or more, only \$16.50 each!! UNBEATABLE VALUE!!



## "IBM" AT TYPE"

EVENORARD

100% IBM\* PC, XT compatible
100% IBM\* PC, XT compatible
Low profile keyboard design
Proper placement of shift keys
with large key tops to suit
professional hypists
3 step heighl-angle adjustment
Cherry brand TS-Mooot 19mm
low profile switches, meet 30mm
ergonomic requirement and
provide high performance and
moving high performance and
provide high pe

SPECIAL, ONLY \$149

NEW! 105 KEY AT TYPE KEYBOARDS!

Auto answer, auto disconnect
 Telecom Approval No. C84/37/1134

only \$249

1200/75 BAUD RATE/BIT

RITRON MULTI

CONVERTER
For computers not capable of split
baud rates Buffers characters at
1200 and converts to 75 baud Cat. X19105

SPECIAL \$299

PURPOSE MODEM
The RITRON Multi Purpose Modem has all the features you require. CCITT V21 300 Baud Full duplex
CCITT V23 1200/75
Bell 103 300 Full duplex
Bell 202 1200 Half duplex



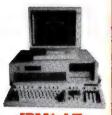
#### IBM\* COMPATIBLES from \$895\*

Assembled & Tested in Australia! Incredible deals to suit everyone including special package deals! \*256K RAM, single drive, graphics, and disk controller cards. \$895

256K RAM: Colour Graphics, Disk Controller Card, 1 parallel port, 2 disk drives and 3 months warranty. only \$1,195

warranty.

640K RAM: Colour graphics,
Multifunction Card, Disk Controller
Card, 2 serial and 1 parallel ports,
2 disk drives and 3 months warranty.
only \$1,295



#### IBM\* AT COMPATIBLE!

Assembled & Tested in Australia
6 MHz
8 80286 CPU

- 8 slots 1 M/Byte main board 1 2 M/Byte Floppy disk drive 20 M/Byte Hard disk
- Colour graphics display card Floppy and Hard disk controller
- card
  Printer card and RS232
  200W Power supply
  Keyboard
  Manual

- All this for just \$3,995

(Monitor not included)



### 48 A'Beckett St, MELBOURNE Phone (03) 663 6151

Mail Order and Correspondence P.O. Box 620, CLAYTON 3168 Telex: AA 151938



#### MAIL ORDER HOTLINE (03) 543 7877 (2 lines)

POSTAGE RATES: \$1 \$9.99 \$10 \$24.99 \$25 \$49.99 \$50 \$99.99 \$2.00 \$3.00 \$4.00 \$5.00 \$7.50 \$10.00 \$12.50 \$200 \$499 \$10.0 \$500 plus \$12.5 This is for basic postage only. Comet Road Freight, bulky and fragile items will be charged at different rates.

Certified Post for orders over \$100 included free! Registered Post for orders over \$200 included free!

All sales tax exempt orders and

56 Renver Rd, Clayton. Ph (03) 543 2166 (3 lines) Errors and omissions excepted







#### APPLE\* COMPATIBLE SLIMLINE DISK DRIVES

Japanese Chinon mechanism,
Cat. X19901 Normally \$225
NOW \$195
(\*Apple is a registered trade mark )



0 M/BYTE HARD DISK DRIVE FOR IBM\* AND COMPATIBLES
Includes hard disk controller card.
Cat. X20010 ............ WAS \$1,250

SPECIAL, ONLY \$995



FLAT IDC RIBBON CABLE 30-59m 1-29m W12614 \$1.90 \$1.70 16 Way Cat. \$1.90 \$1.80 \$1.70 \$2.50 \$2.00 \$2.20 24 Way Cat. \$2.90 \$2.70 \$2.60 25 Way Cat \$3.20 \$2.70 \$2.90 \$2.90 \$3.60 \$3.10 34 Way \$3.90 \$3.60 \$3.40 36 Way \$3.90 \$3.60 \$3.40 40 Way Cat \$4.90 \$4.40 \$4.20 50 Way Cat \$5.90 \$5.40 \$5.10 \$6.10



#### **BRAND NEW FANS**

Quality, new fans for use in power amps, computers, hotspot cooling etc. Anywhere you need plenty of air. 240V 45/8" Cat. T12461 **\$14.95** 115V 45/8" Cat. T12463 \$14.95 240V 31/2" Cat. T12465 \$14.95 115V 31/2" Cat. T12467 \$14.95 10+ fans (mixed) only \$10 each!

#### **FAN GUARDS TO SUIT**

Cat.

T12471 \$3.95 T12475 \$3.95

**COMPUTER PAPER** 

- PAPER TAMER · Restores order to the top of your
- Make to the top of your desk or work area

  Made of white plastic coated steel

  Stores up to 900 continuous sheets
  Allows perfect paper feed

  Allows easy examination of print out



- 31/2" DISK STORAGE UNIT

  Holds up to 40 x 31/2" (diskettes.
  Lockable (2 keys supplied)
  High impact plastic lid and base
  Anti static



### SCREENTEST

2.0 or greater, and either two floppies or one hard and one floppy disk drive.

Installing Perspective is simple: insert disk A, type 'INSTALL' and a batch file does it all for you. There was no copyprotection on the review version, and its Australian distributors assure me none will be implemented on the final version.

Normally, with a good graphics package, it takes about 15 minutes to draw your first simple graph, two minutes to enter the data and about 13 minutes to find your way around the system sufficiently to draw a graph. With Pespective it takes about three minutes in all, and the finished graph is just one variation on a vast number of excellent three-dimensional graphs.

It is obvious from the moment you load this program that Perspective is a particularly well written piece of software. The user interface is a real joy to use, and proves that to make a piece of software easy to use you don't have to slavishly follow the Apple Macintosh WIMPs (Windows, Icons, Mice and Pulldown menus) interface.

Perspective's menu-driven system is totally graphics orientated; the main menu consists of a graphical representation of the function keys f1 to f5. Almost all the operations within Perspective are performed with these five function keys and the occasional use of other keys is restricted to entering data on the numeric keys, the space bar



Perspective's main graph menu



A scatter chart

to remove the menu from a full screen picture and the cursor control keys.

Logically, the first thing you do when creating a graph is enter data. This is carried out via the data manager screen regardless of whether the data is entered directly at the keyboard or from a spreadsheet.

The data manager screen is divided into two parts, the worksheet and the status area. The worksheet takes up most of the screen and resembles a typical spreadsheet, as it is divided into

'Harvard is an attempt to provide everything you need to make a complete presentation.'

cells that contain the data for graphing. However, there is no facility for even the simplest spreadsheet calculation. The status area takes up the top three lines of the screen and allows you to specify which cells will be labels and which will be plotted on the graph as well as a title or subtitle for the graph.

The graph types in Perspective are broken down not by pie, bar and line, but by three-dimensional and two-dimensional graphs. Selecting the 3-D Graph types from the main menu results in the most impressive menu I've ever seen; the screen is broken down into 33 hexagons each containing a miniature



A true 3-D bar graph



A 3-D surface

three-dimensional picture of the different graph types. Pressing the space bar highlights each of the graphs in turn while hitting f1 will draw the required graph.

The bottom right-hand corner of the 3-D Graph types menu contains a familiar two-dimensional type graph. Selecting this takes you to a similar menu consisting of 15 two-dimensional graph types. The selection of two-dimensional graph types consists of the variations on the themes of bar graphs, pie charts, line graphs and point graphs.

All the usual graphs are available such as stacked bar, shaded line and best fit line. Of the more unusual options my favourite is Spectral Mapped Cells. The graph for this consists of a simple grid, each cell within the grid being filled with tiny dots; the higher the value for a particular cell, the more densely the dots are condensed. It's all very pretty but I've yet to find a practical use for it.

The options for customising twodimensional graphs are shown in a fivefunction key graphical form at the bottom of the graph screen. From this menu you can change the colours and patterns used, explode or cut out a segment of a pie chart, switch rows with columns, adjust the bar width and spacing, and turn the grid lines on and off.

Perspective really comes into its own, however, when drawing three-dimensional graphs. All the other graphics programs I've seen which produce three-dimensional graphs use a 'false' perspective by drawing objects within lines that are parallel and, therefore, don't diminish with distance. This technique gives a three-dimensional appearance to what is essentially a two-dimensional bar graph; however, it is totally unable to represent three variables in three dimensions.

The Perspective programs follow Brunelleschi's (the 17th century mathematician attributed with the discovery of true perspective drawings) system whereby objects appear to diminish with distance until they reach a single common vanishing point. This gives a convincing appearance of reality and clearly shows data relationships of three interacting variables.

Perspective offers you 32 different three-dimensional graph types and 16 pre-set viewing angles, which means you can choose from up to 512 different screens when viewing your data — and that's before the customisation options are applied. I don't propose to discuss all the available graph types here, and suggest you look at the accompanying screenshot of the main menu to get a taste of what's available. Needless to say,



## The Thrill of Speed

When time is money, you need answers fast. So you use a PC for all kinds of calculations and enquiries.

But sometimes, even your PC is too slow with the answers to complex questions. So you need extra speed. Here are two simple ways of getting it.

BREAKTHRU 286 is the most advanced, compatible and feature-rich speed card available today. We guarantee it. Together with LIGHTNING, our disk access software, your PC will break all records for quick answers.

#### What makes BREAKTHRU 286 so special?

- It's so easy to install. It is a half-slot card, only 12.5cm in length. You don't even have to give up a full slot. Easy diagrams show how you simply place the card in an open slot, remove the original processor and connect a single cable. From that moment, you are running faster than an AT.
- It is advanced. The heart of BREAKTHRU 286 is an 80286 microprocessor that is faster than the one found in the AT. In benchmark tests, the card accelerated software as much as 700 per cent.
- It is fully compatible. It works in the IBM PC, Leading Edge and most other fully compatible PCs. All existing system RAM, hardware and peripheral cards can be used

without software modifications. Software compatibility is virtually universal.

#### **Lightning Fast – Easy to Use**

LIGHTNING gives you access to your disk-based information up to four times faster than normal.

It is easy to install and you never have to do anything again; it does it all for you – like lightning.

LIGHTNING comes to you on a diskette. You simply load it onto your DOS diskette if you are using floppies or, if you are using a hard disk, into the DOS area. Simple A-B-C instructions let you get it started the first time in five minutes. Then it is always ready, working automatically in the background every time you boot up.

What's it like to use? If you have ever worked with or seen a RAM disk, you know what a difference speed can make when working with any program that accesses the disk. Well, LIGHTNING enables any program to approach the same rapid speed as a RAM disk, but it does it without the disadvantage of losing your precious data if you forget to copy it back to the disk drive. With LIGHTNING, you just use your programs normally. You don't have to remember anything.

BREAKTHRU 286 and LIGHTNING are available together or separately.

Phone (008) 226733 toll-free now for your nearest dealer

SNS

**SNS Computer Systems Pty Ltd** 

Sydney: 2/3 The Postern, Castlecrag, NSW 2068.

Phone (02) 958 2399 or (008) 226733

**Canberra:** 1 Pirie Street, Fyshwyck, ACT 2609. Phone (062) 80 7542 **Melbourne:** 24 Park Street, South Yarra, VIC 3141. Phone (03) 820 0233

Pushpen SNS Sp

## Rampage

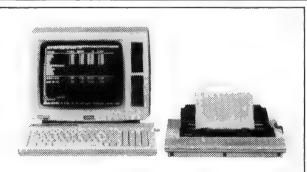


## **AMSTRAD PC1512**

#### The IBM compatible you can trust

At last, the IBM compatible from AMSTRAD. And it is a winner. Backed by AWA, with the reliability you expect from AMSTRAD, the PC1512 is much faster than the IBM PC. Comes complete with GEM, GEM PAINT & MOUSE

From \$1500.00



#### **AMSTRAD PERSONAL COMPUTER** WORD PROCESSOR

The complete business package at a breakthrough price

- Up to 512K ram
- One or two drives
- High res green screen
- Letter quality printer
- Word processing software included
- Australian accounting package available.

#### **COMPLETE BUSINESS PACKAGE** From \$1329.00



## PERSONAL COMPUTER

The Amiga could be called the world's first personal supercomputer. It runs upwards of 10 times the speed of any rivals. It adds hardware animation, video input and stereo sound synthesis to the icon & mouse user interface. Put simply, the Amiga does things other micros can't do.



Shop 13 300 Toorak Road

7.000	_	_
VIII A O O A I E VIII A O		Snec
ANNUE CULL ANNUE		Spec
XMAS SALE XMAS		Amia

Great Britain's biggest selling home computer SPECTRUM PLUS

- All colour computer
- Connect to TV and your cassette recorder (no extra costs)
- Huge range of games, educational & application software.

Only \$199.00

Layby for Xmas

COMPUTERS the business solution	south Yarra 3141 phone (03) 241 3031 tion
☐ Spectrum ☐ Amiga ☐ Amstrad PC1512 ☐ Atari ST	<ul><li>□ Amstrad PCW</li><li>□ BBC</li><li>□ Sinclair QL</li><li>□ Philips multi user</li></ul>
Name	
Address	
• • • • • • • • • • • • • • • • • • • •	•••••

### **SCREENTEST**

they are all variations on the traditional two-dimensional graph types.

There is considerable customisation available for three-dimensional graphs broken into the two basic groups: viewing angle/distance and styling. Despite the complexity of these options, the user interface remains simple and is basically driven by five function keys.

Selecting the 'Custom Viewing Angle' from the main menu takes you to a menu from which you can adjust the angle, size or position of the current graph. The easiest way to understand these options is to imagine the graph as a cube, and, indeed, for certain operations Perspective actually reduces the graph to a box-like skeletal outline which you can then manipulate by rotating it in any plane, moving it towards and away from you, zooming in or out on it, panning in four directions and distorting it.

Styling covers all the editing options for everything inside the graph. There are fundamentally seven styling operations that can be performed. These are the selection of colours and patterns for the walls, floor, base, risers and background; adjusting the spacing between each cell of the grid; adjusting the base height; and column the row changing orientation; turning on the front corner outline; removing grid lines from the walls or floors; and tearing down the back walls.

One problem that occurs with the creation of three-dimensional graphs is that of labelling the axis. Each pre-set graph type and pre-set viewing angle comes with its own compatible label format, but because the labels are also drawn in true perspective, this makes the label totally illegible. An option called Label Manager attempts to rectify this problem by allowing you to change the size, spacing, slant and typeface of characters in order to get the best balance and positioning. A word of warning, however: although this option is useful, it can also result in dreadful looking graphs.

Perspective will accept data from Lotus 1-2-3, Multiplan and any

application that produces ASCII files. As far as printing goes, Perspective supports a limited but well-selected number of printers or plotters, including a couple of laser printers.

The general style of the documentation was good but it has been written in such a way that it couldn't be easily used as a reference manual. I suggest a single read through the complete manual and then put it away; Perspective's ease of use makes it an ideal package to experiment with.

#### Prices

As this issue went to press, Imagineering announced a new release of Harvard Presentation Graphics (see box on this page for details) which will retail for \$834. Imagineering is on (02) 662 4499.

Perspective costs \$575 and is distributed by Megavision on (02) 957 5797.

#### Conclusion

Although both packages can perform the same function of turning a set of data into high quality graphs, they are really poles apart.

Harvard Presentation Graphics has a more general appeal. Creating a report or presentation is something almost everyone has to do at some time in their working life. If your occupation means you have to produce many reports, then I would strongly recommend Harvard as an aid to both the quality and speed at which such reports are produced.

Perspective is a specialist product that has absolutely no competitor in the production of three-dimensional graphs. I suspect there will be a number of users to whom it will be absolutely essential, particularly in scientific, mathematical and highly specialised business applications. However, the user-interface is so good that it may well appeal to less specialised users just because they will be able to create impressive graphs with little effort.

#### New Harvard release

A new version of Harvard Presentation Graphics has just been announced with several new features including:

- The removal of a copy protection scheme
- User selectable symbols and data formats for a variety of markets (including Australia)
- An increase in the number of printers, plotters and film recorders. For example: Apple's LaserWriter, the HP7510A Film Recorder and the Lasergraphics MPS2000 Film Recorder
- The ability to select left, right or centre justification of chart annotations
- The presentation of one full-size, two half-size, three third-size or two quarter-size charts on each page.



## Develop high performance programs with Microsoft C Compiler.

- Generate fast, compact native code with Microsoft C Compiler. Features like register variables, granular run time libraries, and automatic optimization help you produce compact executable files.
- Design programs that make effective use of the available memory of your computer. You can write small, medium, compact, large or huge memory model programs. And you can create mixed model programs using the near and far pointers.
- Link your C routines with routines written in Microsoft FORTRAN, Microsoft Pascal, of Microsoft Macro Assembler. Mix different languages together to utilize the best features of each

#### Take advantage of Microsoft Code View, a revolutionary graphic source-level window oriented debugger

- Control the way your program executes while you're debugging. Trace execution, set break-points, set and watch variables, trace and modify the stack.
- View source and disassembly code at the same time. See data automatically updated as variables, registers, and flags are displayed.
- Speed debugging with Microsoft Code View's highly visual, easy to use interface. Utilize colour, pull-down menus, an optional mouse, and up to four windows.

#### Work with a complete C development environment.

- Use Microsoft C Compiler's full implementation of UNIX System V libraries, three math libraries, a linker, a library manager, and a program maintenance (MAKE) utility.
- Take advantage of the ability to transport your source and object code between MS-DOS and XENIX<sup>R</sup> operating systems.

\$ 780
SOFTWARE

48 A'Beckett St, MELBOURNE 3000
Phone (03) 663 6580
Mail Orders Welcome



# Compaq DeskPro 386

The intention behind the design of the DeskPro 386 was a good one: all the benefits of a fast PC/AT-compatible and more memory contained in an 80386-based machine. Peter Jackson tests the reality of having such excellent features in one system.



Page 42 Australian Personal Computer

The accelerating pace of microprocessor development gave Compag some design problems over the last year. as 32-bit chips like Intel's 80386 emerged in sufficient quantities to make 32-bit micros economically feasible to build and sell. As the leader in the IBMcompatible market, and with some reputation as a maker of solid highperformance machinery, it was obvious that Compaq would build an 80386 machine. But at the same time, Compag does not have the muscle to impose brand-new standards on the business micro world.

The result, the new DeskPro 386, shows very clearly the compromises that must be made in today's high-performance PC market.

The problem was not to do with wrestling the 32-bit processor into a system design, since the 80386 is only the latest development of a long-standing chip family including the 8088, 80186 and 80286, and the hardware and software requirements of these compatible processors are, by now, well understood by hardware designers.

No, the real problem was the IBM PC/PC-DOS standard set by IBM and Microsoft in 1981.

This standard dictates the basic hardware architecture, the expansion bus, the 640k limit on user memory, the maximum disk file size, and the monochrome and colour display standards of any machine that wants to muscle into the corporate market. But

the 80386 offers designers and users the prospect of virtual memory, 32-bit data transfers, 32-bit addressing to get at four gigabytes (4096 megabytes) of RAM as easily as the PC gets at 640k, and blinding execution speeds thanks to 32-bit processing at 16MHz. The prospect of shackling that to the old PC architecture and operating system would horrify any reasonable system designers, and ought to drive them straight into the arms of the Motorola 68020 lobby.

But Compaq exists in the real world, and in the absence of any 32-bit product line or statement of direction from IBM, it has had to tread a narrow path. On the one hand, sticking to the old standard at the expense of performance would waste the potential of the chip and distress the users. On the other, unleashing the full power of the 32-bit processor would mean a proprietary machine with no software available, and no guarantee that IBM would decide to become Compaq-compatible when it launched its own range of 32-bit systems.

The design of the DeskPro 386, the first 32-bit micro from a major name, shows the results of this tightrope act very clearly. We shall see whether Compaq needs a safety net in due course.

But first, there is the 80386 chip itself, and the reasons for building any machine around it.

The main reasons are capacity and speed, since for once there is no

argument - as there was with the 8088 about whether the 80386 is really 8bit, 16-bit or whatever. Everything on the 80386 is true 32-bit, including the data bus, the address bus, the chip's internal storage, and the arithmetic logic unit that does the actual processing work. The address bus size means that four gigabytes of RAM are directly accessible by the processor without any bank switching, while the data bus size means that data is called from memory in 32-bit lumps rather than the 8-bit lumps of the original 8088-based PC. And when that data gets into the chip, the 32-bit registers and the 32-bit logic unit means that it is processed fast. Add to that a standard clock speed of 16MHz against the 4.77MHz of the 8088 in the basic PC from IBM, or the 8MHz of the 80286 driving the AT/E, and it is obvious that the 80386 is a leap forward in microprocessor power.

But there is a lot more to the chip than that. It provides in hardware a lot of system functions that manufacturers are used to seeing in operating system software, and so makes it possible to run multi-tasking, virtual memory applications with enough performance to give small minicomputers like IBM's System/38 a run for their money.

However, when the 80386 is first powered-up or gets a reset, it enters the familiar 'real mode' of the 80286. In this mode, the 32-bit can only address one megabyte of memory using the traditional 64k segments, and looks



When in doubt, 'borrow' an idea from IBM. The 386's keyboard mimics the AT/E's enhanced layout

### **BENCHTEST**

exactly like a 16MHz 80286 except for the fact that 32-bit operands can be used by the extended instruction set of the new chip. Naturally, any package that works on an AT will work in the 80386's real mode unless it checks the clock speed of the chips (as IBM's late-model AT BIOS does).

Changing one bit in a register flips the 80386 into 'protected mode', which gets its name from the fact that specific areas in the memory map can be separated off and write-protected as though they were some kind of disk drive. In protected mode, a whole new range of features opens up, just as it does on the 80286 under Unix or a lookalike such as Microsoft's Xenix.

First, the 80386 mimics the 80286 protected mode features, including the protection itself and the 16-bit instruction set. On top of that sit the specific 80386 features which give the chip its real power. The direct-addressing space goes up to four gigabytes, with no fuss about segments; it can be just one segment if required, rather than the 64k segment limit on the 80286. Also added are memory paging, protection for input and output as well as RAM areas, and the full 32-bit instruction set.

Most important for the future, though, is a third mode of the 80386 called 'virtual mode'. In this mode, real-mode programs can be run under the privilege levels set in protected mode — and if that is too many modes to follow, all it means is that programs written for the 8088, the 8086 or the real mode of the 80286 can be run in separate, protected areas of memory with the assurance that a program will never 'collide' with another by trying to use memory already in use.

This could not be done on the 80286, which has to be in real mode itself to run any real-mode programs at all. There is no such limitation on the 80386, and when a protected-mode operating system appears — perhaps Microsoft's long-awaited MS-DOS 5? — real multitasking with hardware assistance will be a reality. Included in the 80386 is a method of saving the state of an application and loading another in just 17 microseconds, speeding up the task switching that can bug multi-tasking if it needs to be done in the operating system software.

Similarly, such a new operating system could use the virtual memory features of the 80386, which allow more than 16,000 tasks, each with four gigabytes of memory split between RAM and fast disk. The total virtual memory capacity of the 80386 is thus greater than 64,000 gigabytes, a figure which

gives us *APC*'s first mention of the ominous sounding 'terabytes'. The actual figure is 64 terabytes, which is 64x2<sup>40</sup> bytes, or 70,368,744,177,664 bytes.

Unfortunately, there is no operating system that fits the bill as yet, not even current versions of Xenix (although Xenix 386 is promised in the first half of next year'). And if significant increases in performance are to be gained from the 80386 running under clapped-out real-mode MS-DOS 3.1, but retaining the ability to upgrade to the new multioperating tasking virtual-memory systems that are inevitably on the way from Microsoft and others, some clever system architectural work is required. It is that job that Compaq has tried to do with the DeskPro 386.

#### Hardware

The DeskPro 386 looks exactly like its predecessor, the DeskPro 286 — or at least the review machine looked like it. Production machines outside the US will have a grey front panel and disk bezels rather than the black of the original DeskPro, which will give the machine a much less distinctive and IBM-like appearance. In the US only, the front panel stays black.

Apart from the 386 label, the security key and four storage-device slots are all the same as on the DeskPro. On the review machine, the four drives were two half-height floppies — one 1.2 Mbyte and one 360k — in the top row above a new 40 Mbytes cassette tape streamer and a half-height 51/4 in Winchester drive holding 40 Mbytes; a familiar configuration, apart from the increased capacities, from the top end of the DeskPro 286 line

Opening the system unit in IBM PC style, but using Compaq's special unscrewing tools rather than the normal Phillips screwdriver, showed that the similarities with the earlier DeskPro stop at the outward appearance. The internal architecture of the machine has been changed to meet Compaq's design goals.

According to the company, the aim was to produce what the customers wanted; a machine that was compatible with the IBM PC/AT but with twice the speed, lots more memory, and had disks that were both big and fast. All those things are simple individually in 80386-based machines, but harder in one overall package.

Looking at the system board design after removing the lid shows one major new design feature instantly; there is no RAM on the main board. In fact the motherboard is tiny, partly because of this, looking more like the main board of a cheap XT clone than a 32-bit computer. In the usual hefty IBM-size case, shaped to take long expansion cards, the DeskPro 386 board barely fills half the base.

The system RAM is on a separate board plugged into a single 32-bit expansion slot on the left edge of the board, placed in such a way that the memory board fits along the inside of the casing. This slot is quite separate from the seven PC-style expansion slots at the other end of the board, although when expansion boards are put in those slots, they lie neatly parallel with the RAM board but in the other direction. There are seven expansion slots altogether, four extended 16-bit slots for AT boards and three for older 8-bit PC boards.

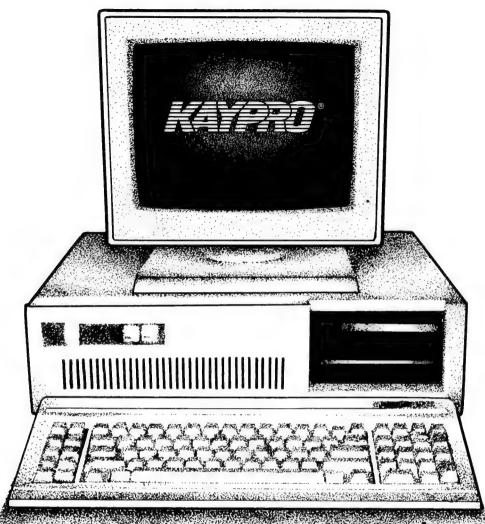
The 80386 chip itself, in a 152-pin square chip carrier, sits next to the RAM board slot and near a normally empty conventional chip socket designed for the 80287 maths co-processor; the 80287 was fitted in the review machine. In theory there is an 80387 maths

'It was interesting to watch GEM performing at the same speed as a Macintosh but in higher resolution and colour, and users of multi-tasking Microsoft Windows will want to lay hands on this machine.'

processor designed to accompany the 80386, but there is no sign of a realease date for that chip yet. As with all Intel processor chips, the 80287 is compatible with the bigger 80386.

The system ROMs, totalling 128k, are placed over by the power supply connectors and the conventional expansion slots, and that completes the major features of the board. There are only about 85 chips on the motherboard in total.

The memory board in the 32-bit slot holds a minimum of one megabyte of RAM, made up of soldered 256kbit RAM chips and expandable to 2Mbytes just by plugging more chips in the empty sockets provided. However, as we will see later, this expansion can only be done in one lump of 1Mbyte, thanks to the memory architecture. An optional piggy-back board fits on this 'system memory board', and comes in two configurations: one is the same as the system memory board, with another 2Mbytes in 256kbit chips, and the other



# Save yourself \$1800 on a PC package!

Invest in a Kaypro PC/XT this month from Robs Computer Centre and we'll give you over \$1800 worth of software free!

Great programs too, like WordStar; MailMerge; CorrectStar; StarIndex; PolyWindows; Mite; GW-Basic; and MS-DOS 3.2.

With these programs you'll be able to do complex word processing tasks; check your spelling; manage your time & phone better; and communicate with other PC's via a modem.

The Kaypro PC/XT is made in the U.S.A. and is completely IBM PC/XT compatible.

Specifications include dual disk drives; 768K RAM; 8088 processor; 8 Mhz turbo switch; serial & parallel ports; clock; mono, colour and composite video output; AT style keyboard; 6 free slots; 132 Watt power supply; key lock; and 12 months warranty.

Make sure you don't miss out on owning this \$4,200 package for only \$2,395 - Phone us now for more information.



295 Thomas Street, Dandenong 3175 Phone (03) 7912900

AdShon/Rob 159

## See the good news yourself by contacting your nearest Atari Dealer

### **NEW SOUTH WALES**

ABS Office Equipment, OURIMBAH BOA Computers, ORANGE Calculator & Comp. Distributors, KELLYVILLE Caringbah Computer Systems, CARINGBAH Castle Computers, CASTLE HILL Chamber Computer Centre, KINGS CROSS Computer 1, RANDWICK Computers Galore, NEUTRAL BAY Computers Galore, NEUTRAL BAY Computech Computer Centre, BELCONNEN Kurrawood Computers, RICHMOND Microcomputer Spot, BURWOOD Microcomputer Spot, SYDNEY Paris Radio Electronics, KINGSFORD Shop 4 Computers, WOLLONGONG	(043) 62 2004 (063) 62 9422 (02) 629 2333 (02) 525 5022 (02) 680 2202 (02) 356 3155 (02) 399 8865 (02) 908 2355 (062) 51 2525 (045) 78 2377 (02) 744 8809 (02) 221 1910 (02) 344 9111 (042) 27 3927 (02) 570 1540
The Big Shop, HURSTVILLE The Computer Place, NORTH SYDNEY The Computer Place, BANKSTOWN The Logical Approach, BELCONNEN Venue Music Pty Ltd, SYDNEY	(042) 27 3927 (02) 579 1549 (02) 957 4690 (02) 708 5843 (062) 51 6349 (02) 267 7288

### VICTORIA

Astro Educational Services, EAST BURWOOD	(03) 232 4000
Atlantis International Comp.,	, ,
MOUNT WAVERLEY	(03) 277 3138
Bolton Brothers, BENDIGO	(054) 43 1455
Calcutronics Pty Limited, HAWTHORN	(03) 816 6631
Chamber Computer Centre, MELBOURNE	(03) 663 4441
City Toy World, MELBOURNE	(03) 663 4431
Compak Computer Centr. Pty Ltd,	
GARDENVALE	(03) 596 7222
Family Music, FORREST HILL	(03) 677 4737
Gametronics, SOUTH YARRA	(03) 241 3031
Maxwell Office Equipment, ABBOTSFORD	(03) 419 6811
Mildura Office Equipment, MILDURA	(050) 23 3611
PH Computers, DANDENONG	(03) 791 3129
Smiths Pharmacy, LEONGATHA	(056) 62 2837
Sound Serious, TECOMA	(03) 754 6305
The Local Computer Shop, GLENHUNTLY	(03) 572 2156
Ultraphase Computers, GREYTHORN	(03) 857 4233
Viatel Computers, BURWOOD	(03) 288 2144
• ′	` '

## **QUEENSLAND**

Alliance Computer Centre, ANNERLEY	(07) 892 1152
Computer Business Aids, MAROOCHYDOORE	(07) 43 5849
Computer City, MORNINGSIDE	(07) 395 6722
Computer Pro, CAPALABA	(07) 245 5122
Computer View, BUNDAMBA	(07) 282 6233
Computerworld Cairns, CAIRNS	(070) 51 2948
Eltronics, ROCKHAMPTON	(079) 22 3446
Datacom, BUNDABERG	(071) 71 4740
Dent-Data-Management, TOWNSVILLE	(077) 79 8555
Execugames, BRISBANE	(07) 229 6396
Philtronics, MACKAY	(079) 57 8855
Retravision Qld Limited, ALBION	(07) 262 6933
Software '80, MILTON	(07) 369 6888
Southwide Comp. Sales & Service, BEENLEIGH	(07) 807 2733
Sundown Computer Centre, CHERMSIDE	(07) 350 3344
Telair Electronics, SOUTHPORT	(075) 31 2302
Universal Services, DALBY	(074) 62 3228
Wholesale Computers, COOLANGATTA	(075) 36 6722

### **SOUTH AUSTRALIA**

The Computer Centre, ADELAIDE	(08) 223 6465
Cybex Computing, NORTHADELAIDE	(08) 267 5855

## **WESTERN AUSTRALIA**

Backgammon Shop, LEEDERVILLE	(09) 382 3211
Backgammon Shop, BELMONT	(09) 478 1115
Backgammon Shop, BOORAGOON	(09) 364 9430
Backgammon Shop, PERTH	(09) 321 2932
Backgammon Shop, CANNINGTON	(09) 458 8846
Backgammon Shop, MIRRABOOKA	(09) 349 9591
Computer Oasis, CLAREMONT	(09) 384 8431
Microbase Computers Pty Ltd, WEST PERTH	(09) 328 9544

#### **TASMANIA**

Computer Craft, LAUNCESTON	(003) 31 6133
Tasmanian Record Company, LAUNCESTON	(003) 31 5588
The Logic Shop, HOBART	(002) 31 0818

## **儿ATARI**

Distributed and warranted by Mobex Pty Ltd. Sydney (02) 406 6277, Melbourne (03) 329 5477, Brisbane (07) 358 5366, Adelaide (08) 212 7455, Perth (09) 328 3355.

## When a PC is voted Personal Computer of the year, that has to be good news.



If you've ever wondered whether there was a better way to get your work done, have we got some good news for you. The Atari ST range of personal computers.

The Atari 520ST was voted Personal Computer of 1985 by a panel of journalists from Personal Computing (USA), Practical Computing (Great Britain), Chip (Italy), Chip and Micromix (Netherlands), Micro-7 (France), Chip-Micros (Spain) and Chip (Germany).

And, voted Best Computer Value of 1985, as rated by the prestigious Info World magazine.

It's the type of machine that can function just as well on the office desk as it will at home.

Its high speed performance, high resolution graphics and the ability to easily expand, means that it can handle anything from personal budgeting to departmental accounts to company sales forecasts, plus educational and games programmes.

The more powerful Atari 1040ST is the 520s big brother. With a powerful one megabyte memory capacity, it's perfect for your more advanced personal and business applications.

Both models have available a library of packages ranging from spreadsheets, data base management, word processing, musical applications and sophisticated video games.

The Atari ST range is bad news for our competition. But good news for you.

## **JLATARI**

Distributed and warranted by Mobex Pty Ltd. Sydney (02) 406 6277, Melbourne (03) 329 5477, Brisbane (07) 358 5366, Adelaide (08) 212 7455, Perth (09) 328 3355.

## Latest Products, Lowest Prices.

Toshiba

PC/XT

T2100 IBM

10MB HARD

DISK AVAILABLE

## The ultimate PC lap portables from Toshiba

Toshiba T3100 -Desktop AT Power, \* Fully functional Toshiba Style!

PC/AT compatible

switchable 8/4MHz

Compatible \* 640K RAM, expandable to 2.6MB on the

\* 720KB floppy drive

system board

\* Integrated 10MB hard drive \* Plasma display 640x400 pixels \* Parallel, serial, RGB colour port

expansion slot

\* Superior 8MHz 80286-2 processor,

Toshiba's revolutionary new lap portables provide performance superior to desktop PCs. Their unique square format plasma displays provide viewing ease and resolution superior to conventional monitors.

Call for further information and prices.

Toshiba P351/351C



quality at dot matrix speeds with Toshiba's new P351 3-in-1 printer. An incredibly fine 24 pin head enables the Toshiba to produce letter quality type at 100cps or draft quality at a staggering 288cps.

Fully IBM PC compatible, the P351 is ultra quiet, making it perfect for office environments.

Printers also available include: STAR, EPSON, NEC & BROTHER. Call for details.

#### MONITOR

Wide range of monitors from leading manufacturers, including TAXAN, THOMPSON, NEC, QUBIE. Lowest prices. Call for lowest prices

#### Multisync, the New **Intelligent Monitor**

from NEC

Works with all graphics cards to display all vou want to see.

Resolution up to 800 dots H. 560 lines V



#### MODEMS

Modem 3+12 PC In/Modem Smartmodem 1200 Smartmodem 123

Smartmodem 21/23 Smartmodem 2400 Sendata modems Call for lowest prices

LOPPY DISCS

#### XIDEX DISKS DISCOUNTED

5 1/4" SSDD \$29.50 5 1/4" DSDD \$34.50

8" SSDD \$39.00

\* Superior

- 8086-2 processor \* 256K RAM standard, expandable to 640K
- \* Twin 720K 3.5 inch drives (1.4MB total) \* Plasma display 640x400 pixels
- \* Parallel, serial, RGB colour port, clock/calendar and an expansion slot

#### PRINT BUFFERS

#### SP100 Series Print Buffer/Switchers

Reduce "printer bottleneck"

The buffers hold up to 144 pages of text from up to 3 computers. A printing job which would hold up a computer for 23 minutes is accepted by the SP100 in just 13.5 seconds!

- \* 3 computers to one printer
- \* Centronics interface
- \* Data input 4,800 bytes/sec



- \* Fast. Max. speed 200mm/sec.
- \* Software compatible with Lotus 1-2-3, pfs Graph, BPS and many other programs.

#### COMPUTERS

Call for best price on IBM PC/XT. NEC APC IV and Olivetti.

#### HARD DISC DRIVES

#### NEW QUBIE BT20 HARDPACK

Slot mounted 3 1/2' 20 megabyte hard disk and controller. \$1245.00

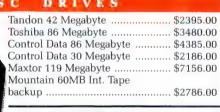
**NEC 40MB Hard Disk** and Controller

Superior quality and reliability 12 months warranty. \$1845.00

Mountain 60MB Ext. Tape .....\$2984.00 CYPHER 20MB Tape backup ...... Call

Note: all drives carry full manufacturers warranties.

Sant Technology Phone (02) 597 2355, (02) 588 1913. Suite 3, 58 Bay Street, Rockdale, NSW 2216. All prices \* Include sales tax \* Subject to change without notice \* Do not include delivery. Quantity discounts available. Many items are not listed, please call for specific item.



#### FINANCE AVAILABLE



**TECHNOLOGY** 

### BENCHTEST

provides 8Mbytes using the same number of the 1Mbit chips that are now starting to emerge in volume from the Japanese silicon foundries.

This way of handling system RAM means that 10Mbytes can be installed in the box without using any expansion slots at all, and also puts a tentative toe in the water of standard-setting. Compaq will freely give details of the 80-pin 32-bit bus used in its memory slot to anyone who wants it, and nobody would be happier than Compaq if dozens of third-party companies leapt forward to build 32-bit add-on boards to plug into the piggy-back connectors on the memory board.

In fact, using more conventional bigmemory boards like Intel's Above Board or AST's RAMpage in the more conventional PC-style expansion slots, Compaq claims a maximum RAM capacity of 16Mbytes.

The floppy disk drives have no surprises to them; the basic system comes with a single 1.2Mbyte floppy drive, and in the review machine this had been supplemented with an optional 360k drive.

The hard disk drive options, however, are different. There are two hard disks in the Compaq line, one with 40Mbytes of storage and one with 130Mbytes to the customers' researched demands for more disk space. To get high speed, Compaq has used an integrated controller for the 40Mbytes drive, and an even faster ESDI standard external controller for the 130Mbvtes unit. With the 40Mb drive the access time is promised to be less than 30ms. while on the larger drive it is less than 25ms — and Compaq claims that in real life it has a 17ms average access time in tests.

Importantly, the floppy controller, as well as the tape streamer control, are built onto the input/output board included with the system, along with one 25-pin parallel port and one nine-pin serial port just like the AT. Therefore the minimum storage configuration of the DeskPro 386 does not take up any expansion slots beyond the one used by his version. Choosing the 130Mbytes drive also cuts down the storage options, since it is a full-height drive compared with the 40Mbyte's half-height.

The only other board in the review box was Compaq's new Enhanced Graphics Adaptor (EGA) board, which comes with its own 256k of display memory. This board, built to Compaq's own design rather than bought in from one of the many third party makers of EGA-compatible boards, gives the usual EGA resolution of 640 × 350 pixels in 16 colours selected from a palette of 64.



The 386 provides four slots in one unit, including a 40Mbyte tape streamer



Input/output is via expansion boards, but 32-bit expansion is internal only

But to maintain compatibility with earlier Compaq and IBM models, the board can also handle the unusual Compaq dual-mode text-and-graphics monitor format of 720 × 350 pixels in monochrome.

To go with the EGA board, there is also a new 13in RGB colour monitor with built-in tilt and swivel. Both monitor and board will be available to existing DeskPro users alongside Compaq's existing green and amber monochrome screens, and the system package prices now unbundle the monitor since there is a choice of colour or not.

The keyboard on the review machine was a new Compaq model mimicking the layout of IBM's latest enhanced keyboard, launched with the AT/E. This has a separate cursor key cluster and 12 function keys rather than the normal 10, a change made by IBM to improve compatibility with its minicomputer and mainframe terminal keyboards. Users who, for some reason, prefer to have a combined cursor and numeric keypad

can still use the old DeskPro keyboard with the new machine.

So far, so commonplace. Apart from the unusual placing of the system RAM, this could just be another fast AT clone. The RAM organisation, however, is crucial to getting the required high performance out of the system with the inadequate operating system software that Microsoft provides as MS-DOS 3.1

#### System architecture

As we have seen, Compaq's aim was to maintain compatibility with software and add-on hardware aimed at the IBM PC and AT markets, while providing twice the performance of IBM's fastest AT. The fast processor speed and fast hard disk drives can go some way towards that, but not far enough.

So, the DeskPro 386 is split into two functionally separate parts. On one side of an invisible divide is the processor and its 32-bit slotted RAM; on the other is an

### **BENCHTEST**

8MHz AT clone. All the data and address bus lines to and from the expansion slots — bar the 32-bit one — run at 8MHz rather than the 80386's 16MHz clock speed, to cut out any speed problems with third party boards.

However, on the 32-bit side of the machine, things are different. The RAM organisation has been set up to work with the efficient 32-bit pre-fetch mechanism of the 80386; this mechanism gets data from memory before the processor actually needs it to work on, speeding things up since the data needed is always right there on the chip rather than miles away in main RAM.

Data is transferred from the RAM chips to the 80386 in 32-bit words, and transfer speed is improved by organising the RAM as an array of static-column devices. RAM is divided into pages, each page being made up by keeping the memory row address constant and changing the column address. With the DeskPro 386, the page size is 2k.

If consecutive memory accesses are within the same page, then the RAM access time is 50ms compared with 100ms if the consecutive accesses are in different pages. Working with the 80386 pre-fetch, this means that the Compaq RAM operates with less than one wait state per 32-bit access — in fact, Compaq claims an average 0.8 wait state.

All that technical stuff is necessary to show why the 32-bit RAM in the DeskPro 386 is *fast* — much faster than the speed of the individual memory chips would indicate. That extra RAM speed increases the performance of the machine even further above that of the 8MHz AT.

Moreover, if memory above 1 Mbyte is installed in the 32-bit slot, it can act like Lotus-Intel-Microsoft expanded memory using software jointly developed by Compaq and Microsoft, and called the Compaq Expanded Memory Manager (CEMM). The speed of the RAM means that the L-I-M bank switching is much faster than it is in conventional AboveBoard type expanded memory. Real Above Boards or RAMpage boards can be plugged into the ordinary expansion slots and handled by CEMM as well.

But that was still not enough speed. So at boot-up time, the system ROMs check to see whether the ROM on the EGA board is present; if it is, the system copies itself and the EGA ROM up into fast 32-bit RAM between 640k and 1 Mbyte and runs from there, mapping back down to the appointed place in the memory map so applications can find the ROM in the RAM. The area of RAM

#### In perspective

It is difficult to compare the DeskPro 386 with anything else on the market, since it is the first of the 80386 machines that is not trying to do anything particularly special. For example Corvus has launched a \$US15,000 file server for its network products.

But Compaq is positioning the DeskPro 386 first of all as a single poweruser's PC, although it acknowledges that it would make a fine file server for something like a dozen PC clones, given the right network hardware and applications software.

It is hard to guess how many power users there are who need twice the performance of an 8MHz AT. But Compaq claims that 29 per cent of its users are responsible for 72 per cent of the cash orders, and it is those users who were asked for the specification of their dream machine.

Compaq has been careful not to cut itself off from full compatibility with the IBM PC line, while building-in an architecture that can take advantage of the improved operating system software that *must* come sooner rather than later.

above 640k used as 'ROM' is reserved for system use, and is write-protected by the system ROM after the transfer.

Replacing the slow EGA ROM with fast RAM speeds up the graphic performance on the machine if an EGA board is fitted, and the switching of the BIOS ROM speeds up the whole thing. As an example, the fast RAM is five times as fast as the 250ns ROM chips used on the motherboard and the EGA board.

With all these speed-up modifications to the system architecture, combined with the raw speed of the 80386 and fast disks, Compaq claims to have met its design goal of twice the performance of the 8MHz AT/E without sacrificing any compatibility at all.

#### System software

In the absence of a protected-mode multi-tasking memory operating system, the DeskPro 386 comes with MS-DOS 3.1 as its main piece of system software and Xenix System V/286 — using the 80386 in its 80286 mode — as an option.

A few additions have been made to MS-DOS besides the CEMM driver; in particular, a speed command has been included to slug the 80386 speed down if particular applications demand it. Typing 'spe-fast' cuts the system speed down to 8MHz, while typing 'spe-high' turns it back up to 16MHz again. The speed can also be cut to 6MHz if required, since some early AT software either checks the processor speed before running or uses the speed as part of a copy protection scheme.

Another step forward is the tape streamer support. With the new 40-Mbytes streamer now available, selective back-ups of individual files or directories can be made without worrying about overwriting the next file along. The streamer also allows back-up of more than 40Mbytes across more than one tape, and will read tapes from

#### Technical specifications

Processor: Intel 80386, 16MHz; socket for 80287 maths co-

processor

RAM: 1 Mbyte, expandable to 10 Mbytes in one slot

ROM; 128k

Mass storage: Half-height 1.2Mbyte 51/4in floppy drive; half-height

40Mbyte Winchester drive

Storage options: Full-height 130Mbyte Winchester; 360k floppy;

40Mbyte intelligent tape streamer

Display: Compaq dual-mode monochrome monitor, in green or

amber; EGA colour monitor and display card, resolution

 $720 \times 350$  in 16 colours.

Keyboards: Old-style IBM AT-compatible 85 keys; new-style IBM

Standard enhanced, 101 keys

interfaces: Centronics parallel port, 25-pin IBM PC connector;

RS232 serial port, nine-pin D-type connector

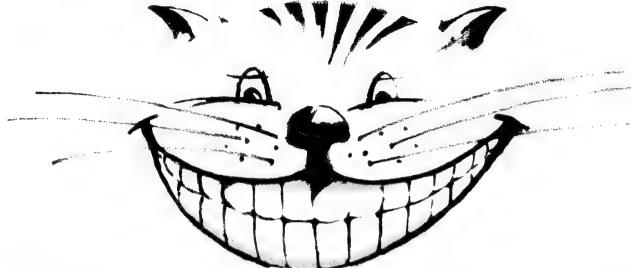
Expansion slots: One 32-bit, piggy-backed on RAM board; four AT-style

8/16-bit; three PC-style 8-bit; one slot taken in basic

40Mbyte configuration

Operating MS-DOS 3.1, with Compaq BIOS and CEMM memory

systems: manager; Xenix System V/286



# Programming Solutions can be as elusive as the Cheshire Cat.

Alice will help you through the Pascal maze.

o a lot of people, computer programming is a Wonderland inhabited by March Hares and Hatters, speaking a language of their own, and about as accessible as Lewis Carroll's strange looking-glass world.

Though now, if you own an IBM or compatible personal computer, you've got a personal guide – ALICE: The Personal Pascal.

ALICE: The Personal Pascal.

ALICE is a unique and powerful piece of software which enables you to write your own programs, and introduces the world of Pascal, the computer language. For the novice, ALICE makes learning Pascal simple, with an "intelligent" editor making the mechanics of writing a Pascal program nearly as easy as "filling in the blanks". Experienced programmers will find ALICE's interpreter the most advanced source-level Turbo Pascal de-bugging tool available.

"What is the use of a book," thought Alice, without pictures or conversations?"

The same comment applies to a programming environment – ALICE provides over 500 "Helpt" screens, with context-sensitive help, ranging from "What can I type here?" to "What program called up this sub-routine?". At the same time ALICE provides immediate assistance with problems, instructing the user about Pascal – so programming gets easier and easier.

"That's the reason they're called lessons" remarked the Gryphon: "they lessen from day to day."

There are no language tricks, because ALICE knows all the rules of Pascal. This allows you immediate type

and syntax verification as you go along – ALICE won't let you make a mistake!

"I can't explain myself, I'm afraid, sir," said Alice...

Our ALICE certainly can explain herself. In fact, explaining is one of her biggest features. Contact us, and let ALICE be your guide to the Wonder land of computers. Available through Microway or your local dealer at a price that makes ALICE truly wonderful. Recommended Retail \$214.

Write or call us now, and we'll send all the literature and a Demonstration Disk at the cost of \$12, in which ALICE explains everything about this unique and powerful piece of software.



## MICROWAY The Pascal Specialists

292 Chesterville Road, Moorabbin 3189. Phone (03)5554544
Yes, please rush me a copy of D all the literature | sample disk | ALICE.
| Please charge my | Master | Bankcard | Visa (please incl. \$8 post.)
| Cheque enclosed.

ALICE

The Personal Pascal

ALICE the Personal Pascal is a Trade Mark of Graham Software — IBM is a Trade Mark of International Business Machines — TURBO PASCAL is a Trade Mark of Borland International MICROWAY is a Trade Mark of Excel Computers Pty Ltd — Alice in Wonderland is the copyright of Machillan Publishing UK.

Compag's earlier 10Mbytes streamer but not write them.

Apart from that we are in familiar territory with MS-DOS, and there is little more to add.

For the future, until Microsoft produces a new version of MS-DOS to drive the 80386 properly, the only new operating system for the machine will be Xenix System V/386. Compag and Microsoft are working on the product now for release in the first half of next year, and claim that it will be the first operating system to use 32-bit program code.

Gold Hill, with its Golden Common Lisp language, Information Builders. Aplix, and Cobol specialist Ryan-McFarland are all working with the Microsoft Toolkit to produce 32-bit applications for Xenix System V/386 and the DeskPro 386.

According to Microsoft, the new Xenix will support the large linear RAM space and demand paging of the 80386, and allow more efficient use of memory and hard disk capacity for large applications as well as provide separate protected memory areas for secure multi-user applications. It will also let users get at the full 14Mbytes of RAM and four gigabytes of virtual address space of the Compag machine.

#### Applications software

Compaq claims that 20 major software and hardware developers have completed compatibility tests on the DeskPro 386, and have concluded that all their products work. A leaflet listing 160 or so products that Compag has tested is also included with the machine.

The developers include Ansa Software, with the Paradox database: Ashton-Tate, with dBaseIII Plus, Framework II, Multimate 3.3 and Advantage; Autodesk with AutoCAD; Borland, with its full range; DCA, with its of communications including IRMA; Lotus with its full range; Microstuf with its full range, with the proviso that one must run at 6MHz or 8MHz speed; and Quadram with several boards including Quadmeg Quadcolor II, QuadEGA+.

In a rather more modest test of compatibility, I installed Digital Research's Concurrent DOS and GEM, the AutoCAD design package, Word Perfect, Pink Software's TurboCAD, and Microsoft's C Compiler Version 3.0.

Most of them ran flawlessly and fast on the DeskPro 386, particularly graphics-based packages like GEM Draw, GEM WordChart, and AutoCAD. The sieve program included with Microsoft C found 1899 primes almost



Compag's first colour monitor running a high-res graphics demo

instantaneously, while Word Perfect did not act much differently than it does on a 4.77MHz 8088-based PC, since it depends on user input so much.

The problem came with Concurrent DOS, which could not find the DeskPro's hard disk drive. Compag says that Digital Research is aware of the problem with Concurrent and that a fix would be made.

A version of Borland's SideKick also crashed the machine, seeming to have some trouble with the EGA card. But that was an early version that had no EGA option on the installation menu, and if Borland says that SideKick works with the DeskPro 386 now, I would be inclined to believe it.

The code compatibility of the 80386 with the 80286 and even the 8088 means that, in theory, any PC or AT package should work with the 80386. As ever there is a gulf between theory and practice, and it is worth making sure that the package you want to use is on the approved list, or check with the publisher, before laying down cash for the machine.

As a very rough test of speed besides the Benchmarks an AutoCAD drawing was plotted at full speed and once with the speed cut to 8MHz, but both using the 80287. On average, the 8MHz plot took just under twice as long as the fullspeed one.

#### In use

The DeskPro 386 performed quickly and well throughout the test period. The keyboard has been improved, getting rid of the unpleasant squashy feeling on the earlier DeskPro models, and the colour monitor, combined with the EGA board, is an impressive piece of work. The colours are bright, and the switching of the EGA ROM into fast 32-bit RAM speeds up the EGA's normally sluggish performance.

It was interesting to watch GEM



#### Consolidated **Electronics**



CDCT 6000 Series The CDCT 6000 gives high resolution and brighter reproduction. Its modular construction gives electronic reliability and easy servicing.



**Barcodata Projectors** The Ultimate computer graphic projector, producing crisp, clean, high density large screen computer graphics.



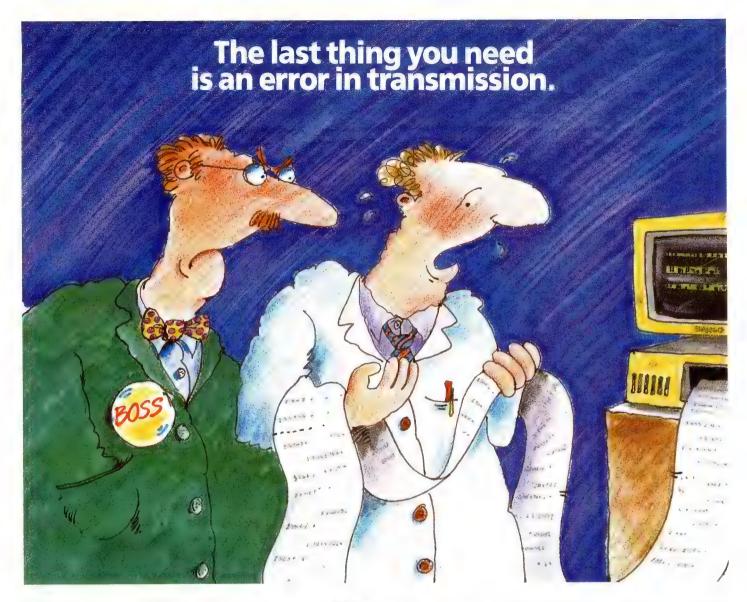
PAD displays Timed cycling of messages and graphics; alpha-numerics and semi-graphics in up to 7 colours; easy editing; up to 64 pages of non-volatile memory; video and computer input.

Head Office, Victoria 15A Anderson Road, Thornbury 3071. Tel: (03) 484 0791. Telex: AA32463.

**New South Wales** 40 Raymond Street, Bankstown 2200. Tel: (02) 708 3766. Telex: AA122121.

Oueensland 391 Montague Road, West End 4104. Tel: (07) 846 2020. Telex: AA41357.

Western Australia 5 Kewdale Gardens, 173 Planet Street, Carlisle 6101. Tel: (09) 362 6177. Telex: AA 95710.



At the heart of the perfect system is a good MODEM.

And a good MODEM not only means peace of mind - but guaranteed performance, reliability and a reasonable price.

#### 7 models in the range

The CEDATA range of MODEMS gives you all that and more - a range of 7 models. Starting from the CEDATA 123AD (with V21, V22, V23, Auto Dial, Auto Standard Select, Auto Answer/Auto Disconnect) through to the CEDATA 2301 Dual Standard (V21, V23 originate only) MODEM.

#### Look at these extra features

Metal case for RF shielding and ruggedness.

Inbuilt power supply (no messy plug packs).

Easy-to-read status indicators to enable rapid, reliable assessment of equipment operation - you can't go wrong.



Selecting a modem with guaranteed performance and reliability can save you costly and embarrassing mistakes. Telecom Approved.

Designed and manufactured in Australia guaranteed back-up service.

#### And look at these options

Rack mounting in a high density rack (up to 16 MODEMS per rack)

**Battery Power** 

Viatel Software

**Baud Rate Conversion** 

Auto Dial (Hayes™compatibility)

So for complete peace-of-mind on your new MODEM fill in and return this coupon for more information on the CEDATA range.



#### Consolidated lectronics

15A Anderson Road, Thornbury, 3071. Vic Ph: (03) 484 0791

Consolidated **Electronics** 

**Exclusive manufacturers and** distributors for the Cedata Modem.

#### Please send further information on:

- ☐ Cedata Modem
- ☐ CDCT 6000 Series
- ☐ Barco Projectors
- ☐ PAD displays

Name\_

Company\_\_\_\_ Address \_\_

Postcode \_\_\_\_\_ \_\_ Tel: \_

B&W/CF481/APC

performing at last at the same speed as a Macintosh but in higher resolution and colour, and users of multi-tasking Microsoft Windows will want to lay hands on this machine.

Apart from the problem with Concurrent, there were no glitches or crashes, and for such an early machine - still with the black front panel! - it looked like a very solid product indeed.

#### Prices

Unusually for Compag, the DeskPro 386

is aggressively priced, with 1 Mbyte of RAM, one 1.2 Mbytes floppy drive, a realtime clock, serial and parallel ports, and the 40Mbytes Winchester, the box costs \$14,250 including a choice of keyboard but minus monitor.

With the 130Mbytes Winchester, the price goes up to \$18,947. Option prices include \$7070 for the four to eight megabyte 32-bit RAM expansion board, a high price thanks to the scarcity of 1 Mbit chips; \$503 for the 360k floppy drive, \$1397 for the EGA board and \$1397 for the monitor: \$838 for the 80287 chip; and an aggressive \$1706 for the intelligent 40Mbytes tape streamer

#### Conclusion

It is hard to escape the feeling that Compag has made the best of a bad job with the DeskPro 386. Given an 80386 and unlimited freedom, a competent microprocessor engineer would not have come up with this design.

But given the constraints of the market-place and the operating system, Compag has worked hard on an innovatory architecture that sets almost no new standards, but which gets better performance than expected out of existing standards.

If it gets a real operating system, and drops all this L-I-M bank switching, 32 Mbytes file size limits, and 640k main. RAM barrier, the DeskPro 386 should give any new IBM PC a run for its money. And it stands a fair chance of a crack at the System/38 as well.

At press time, Compag announced a 70Mbytes Winchester version of the 386. It will retail for \$16050 - Ed.

END

#### **Renchmarks**

Old:		New:	
BM1	0.15	Intmath	1.0
BM2	0.56	Realmath	0.96
BM3	1.45	Triglog	3.85
BM4	1.45	Textscrn	25.50
BM5	1.55	Grafscrn	4.8
BM6	2.65	Store	2.6
BM7	4.05		
BM8	4.60		
Average	2.06		

All timings in seconds. For a full listing of the Benchmark programs, see End Zone.

## PLUG-IN, BACK-UP It's that easy with a Cipher 5210 Flow USERS 1.1Mb/minute speed - more convenient and easier than floppies. Simple commands - FTBACKUP, FTRESTOR, FTFORMAT. Selectively archive data from hard disk. • Single 1/4" cartridge replaces up to 50 floppies. File orientated – only back-up what you need to. Eliminates data transfer problems with mirror image

ELMEASCO

## Instruments Pty. Ltd.

NEW SOUTH WALES VICTORIA 15 McDonald Street. MORTLAKE P.O. Box 30, CONCORD **NSW 2137** Tel: (02) 736 2888

Telex: AA25887

12 Maroondah Highway. RINGWOOD P.O. Box 623, RINGWOOD VIC 3134 Tel: (03) 879 2322

Telex: AA30418 ELTENT

QUEENSLAND Tel: (07) 875 1444

S. AUSTRALIA Tel: (08) 344 9000 W. AUSTRALIA Tel: (09) 481 1500

multiple installations. Cipher 5210 Floppy Tape System suits -IBM PC/XT PC/AT

copying due to bad sector maps.

IBM 3270 Workstation

AT & T 6300

Advance 86B

Commodore PC

Compaq Plus

Corona PC-HD

Ericsson PC

Kaypro 16

Nixdorf 8810/25

Olivetti M24

• Philips P3100

Sperry PC/XT

T.I. Business 100

• T.I. Pro • Zenith



Dealer enquiries welcome



## First Choice

Specifically designed for the new breed of IBM clone users, First Choice is an inexpensive, easy-to-use integrated package which is well aware of its limitations. John Donaldson put it through its paces.

Whenever I think of an integrated package such as Framework or Symphony, I almost have a nervous breakdown on the spot. It is very refreshing, therefore, to see a new integrated package which is a) very cheap and b) knows its limitations. First Choice from pfs software is designed as an easy-to-use integrated package based around a central word processor. It is specifically designed for the new breed of IBM clone users who have bought a cheap clone and who go green at the thought of spending a fortune on software.

First Choice is designed to run on the IBM PC or any compatible. The only possible problem you could face is that because it is designed to work solely in the RAM of your machine, you need to have at least 256k of memory installed in your machine. Obviously, the more memory you have, the more you can do.

The review software consisted of a pre-release version of First Choice, so it

Friend Defeators Defeate 52 felt feetyle
22 felt Line 15 of his
First Chrise nothern revite / John Provides / Prov 2

The word processor is easy to use . . .

was supplied without any packaging on ordinary non copy-protected disks with a photocopy of the manuals. I would expect the finished version of the packaging to be far more professional.

Installation was extremely straightforward and simply involved copying the files from the two distribution disks onto the hard disk. If you are using a twin floppy system, the manual includes clear instructions on how to back up the master disks. One interesting point is that the manual also includes instructions on how to copy the files onto the new IBM 3½ in disks which are used on the PC Convertible.

When you have copied your First Choice files, you can run the program simply by typing "FIRST". The software is set up originally to assume that it is running on a monochrome IBM PC with a general purpose ASCII printer and a Hayes-compatible modem.

When you first run the software, you can select the 'Set Up Equipment' option from the main menu. This allows you to



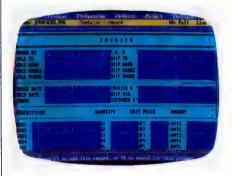
The spreadsheet is less easy to use . . .

tell the program whether you are using a colour or black and white screen and choose a printer or modem from the list of available drivers. When you have done this, First Choice will remember your new settings every time you run it.

#### In use

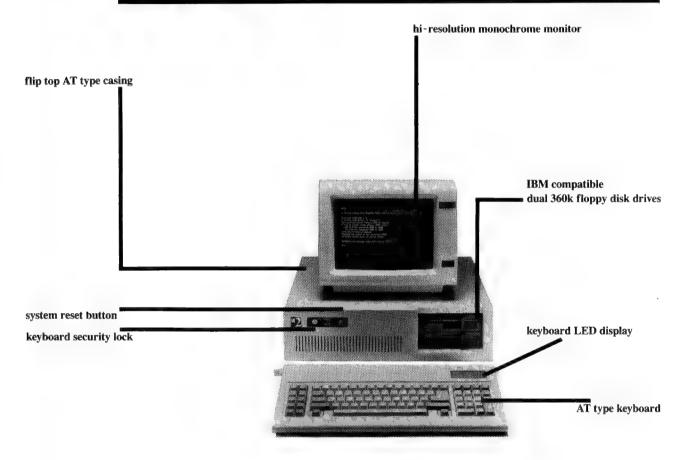
When you run the program, you are greeted by the top level menu. Its exact look will vary according to what type of IBM display you are using. I used an Enhanced Graphics Adaptor and the menu came up in a very tasteful combination of black, light blue, dark blue, pink and a very fetching aquamarine. If you are using a monochrome monitor, however, these delights are not to be, and you have to put up with black and white. Ah well.

Whatever the menu looks like, the contents are the same. You are presented with a list of eight options which allow you to use the word processor, the database, create a report,



And the database is very basic ....





#### **HAL 2** Standard Configuration

**Processor:** Intel 8088-2 4.77/8MHz (switchable)

Memory: 640k, all IC in sockets

Storage: dual 360k FDD

Monitor controller: Hercules/color

Multi I/O: parallel, serial (2nd optional) and games ports,

real time clock, disk drive controller

Keyboard: 84 keys with LED indicator (AT type)

Power supply: 150w power supply

Case: flip top AT type

Monitor: TTL monochrome/color

Operating system: fully licensed MS-DOS

Warranty: 12 months

20MB Winchester (optional): Tandon

Dealer enquiries only: contact Michael Wee 02 516 5573

HAL authorised dealers: New South Wales: Chippendale, Computer Exchange, 698 8855; Brookvale, The Computer Factory, 938 2522; City, Data Discounts, 238 2195; Parramatta, Foremost Office Equipment Pty Ltd, 635 5477; Drummoyne, Microstation, 819 6348; Newcastle, Pacific Office Machines, 044 22358; Grafton, Grafton Computer Centre, 066 426790; Queensland: Maryborough, Kellor Electronics, 07 214559; Ipswich, Computer Magic, 07 8161830; Nambour, Nambour Electronics, 071 411604; Toowoomba, P.C. Computer Shop, 076 385001

### **SCREENTEST**

plan a spreadsheet, retrieve a file from disk, connect to another computer, change the settings for the program or exit to DOS. You select an option either by typing the appropriate number on the keyboard, or by using the cursor keys and pressing return.

#### Word processor

The whole thrust of First Choice is centred around the word processor, pfs believes (rightly in my view) that the word processor will be the most heavily used part of First Choice, so there are more features in this section.

The word processor also forms the model for the user-interface for the other sections of the package. So as soon as you have mastered the word processor, the other sections will be no problem, because they look and behave in much the same way.

When I first tried the word processor, I was impressed with how well the screen was laid out. The display is made up of five main parts. The top line contains the pull-down menus which are used to control the program. The next line down displays the current document name, the line and page number of the current cursor position and a figure to tell you how much memory you have free.

I found that on the review machine with 640k of RAM installed, I ran out of memory after about 25 single-spaced pages. The middle of the screen is initially blank and is used to display the contents of the document you are editing. Finally, the next to bottom line displays the ruler along with the current margin and tab settings, and the bottom line instructs you to press F1 for help or ESCape to get out of the word processor.

This general layout is followed for all the modules of First Choice as well as the word processor. This is good because you know where the general commands in the pull-down menu will be. You also know that F1 will always get you context-sensitive help and that ESCape will always get you out of whatever you are doing.

The word processor uses six pull-down menus which are selected by hitting functions keys F2 to F6 (f1 gets Help, remember?). From left to right they are labelled 'Save', 'Features', 'Print', 'Edit' and 'Style'. Once you have hit a function key to select a pull-down menu, a set of sub-menus is displayed on the screen. You can then select the function you want either by typing its number or by using the cursor keys to highlight the function name and pressing Return.

To take each of the main menu options in turn, Save gives you four options; Save

a copy of the current document, Save selected text only, Merge another document and Erase a file. These options make use of First Choice's 'Directory Assistant' which makes it very easy to select files.

The Merge Print option allows you to merge other documents into the current one. This can be very useful for creating standard letters by merging together different standard paragraphs. Another use could be to include, say, a small spreadsheet file in a word-processed document.

One nice touch is that First Choice will automatically save an ASCII version of your file if you use an .ASC extension on the filename. So, for example, MYFILE.ASC will be stored in ASCII.

The Features menu has a total of six sub-options: Find and Replace, Check Spelling, Set Tabs and Indent, Set Margins and Page Length, Set Bookmark and Find Bookmark.

Like the Merge Print feature, the spelling checker is another standard feature which I am very pleased to see in such a low-priced product. First Choice is supplied with an 85,000 word dictionary against which it checks your words of wisdom. Both American and British versions of the dictionary have been produced; the British version is being distributed in Australia.

The Set Margins and Page Length option make it very easy to change the size of the document and also allows you to insert up to two lines of header and footer text. Page numbers can be automatically inserted by using the \*PAGE\* command, although it is not possible to alter the position of the number of odd and even pages.

The two Bookmark options allow you to set up to six tags which the system jumps straight to. Although this can be helpful in long documents, the advantage of this is that it is not limited to the word processor. You could set, say, one bookmark at the front of a word processor document and another in the middle of a spreadsheet model, and use the Find Bookmark option to jump between them.

The Print section has three submenus; Print this document, Print selected text only and Print form letters or labels. The last option is by far the most interesting because it allows you to create a form letter and then merge it with data from the database to produce customised letters, circulars, and so on.

The Edit section has no less than nine sub-menus; luckily most of them are self-explanatory. These are: Select text, Cut out selected text, Copy selected text to Clipboard, Move selected text to

Clipboard, Paste from Clipboard, Insert a blank line, Erase this line, Erase this word and Erase this document.

For any block operations involving the copying, moving or deletion of a chunk of text, First Choice uses the concept of a clipboard. This idea was made popular by the Apple Macintosh and involves the temporary storage of a piece of text until you decide what to do with it and 'paste' it back into the document.

Once you have got used to using the commands in the Edit menu, you will find that it is possible to use special keystrokes to avoid the tedium of having to go to the menu and select a suboption. So, for example, instead of selecting 'Erase this word' from the Edit menu, you could simply press Alt W to delete a word.

The final pull-down menu, Style, also has nine sub-options related to the look of your document. These are: Boldface, Underline, Italics, Superscript, Subscript, Erase style, Single space, Double space and Centre.

In these terms First Choice is about as WYSIWYG (What You See Is What You Get) as it is possible to be on an IBM. I must say that I found the First Choice word processor very simple to use. One of the nicest features I found was the ability to embed printer control codes within the document simply by surrounding the code with asterisks. This can be very useful if you are trying to do something flash with your printer.

One of my major annoyances was that every time you start the word processor, it defaults to overtype mode instead of the insert mode which I am more used to. Invariably I only remembered this after I had destroyed some of my text.

Most of my other problems centred around bugs in the pre-release version of the software. These ranged from bookmark features which did not work properly to some more serious bugs in the cut and paste routines. This resulted in lost text, wrong formatting or a hung system. Hopefully the release versions of the software will not be afflicted in this way.

#### Database

The database is probably the least powerful of the functions provided within First Choice. I have a feeling that most people will only use it to maintain lists of data to merge print into the word processor.

To create a database, you simply design the input screen using the cursor keys to move about and then type the field names followed by a colon, '(:)', to tell the program that this is a field name. The database screen looks exactly the

The new Micro10 Perfect 286+ Compatible features the Perfect Specs

Operating Speed: Internal Hard Disk: RAM Memory: Price: Way under Software availability: Over Compatibility: Audited Performance ratio against the ORIGINAL:

## The World's Perfect "10".

.. Micro10 your Perfect choice of Business Computer.

AUCKLAND



PERTH



. . Ring Now

Dealers Wanted

14 Whiteside Road, Clayton South, Vic 3169 Tel. (03) 543 7244. Tlx. AA31781 Fax. (03) 543 5230

### SCREENTEST

same as the word processor screen — even the spelling checker is still there.

Once you have completed your form design, you hit F10 and the system memorises the form. As soon as this is done you can start entering data using the Tab key to move from field to field. When the form is complete you press F7 to add the record. All fields are freeform.

Records can be retrieved by typing the words or numbers you are searching for into the appropriate field and hitting the F8 key. Partial matches using '..' and '?' are possible as are relative matches using the logical operators '<', '>' and '='.

The one thing to be said for the database is that it is very easy to use. To be fair, pfs doesn't even call it a database and prefers to call it a file manager. I suppose this is a fair assessment of what it does.

#### Report generator

The report generator is actually more powerful than the database it supports. Using the report generator you can take data from the database and play lots of neat tricks with it.

For a start you can select which fields from the database you are going to use for the report. You can then sort the data in ascending or descending order, add it up and produce sub-totals and averages. You can even create derived columns in the report by performing logical operations on other columns, so you could say, for example, that column three equals column one plus column two.

#### Spreadsheet

Of all the functions of First Choice, the spreadsheet is the least easy to use. For a start, the design of the screen looks slightly different from the other modules.

This is mainly because of the spreadsheet matrix displayed in the centre of the screen. For some reason First Choice only uses half of the usual grid to display the spreadsheet, so where most packages would have vertical lines to separate the columns and horizontal lines to separate the rows, First Choice only separates the columns. I found that this makes it difficult to tell exactly which row some numbers are in.

One particularly nice feature of the spreadsheet is that it displays the

maximum spreadsheet size you can use on your machine. On the review machine with 640k of RAM, this was  $1024 \times 768$  cells. Obviously this varies according to how much RAM you have installed.

Typing a value into the spreadsheet is simply a question of moving to the desired cell and typing the number. Entering a formula, however, is more complicated.

The majority of popular spreadsheet programs such as Lotus 1-2-3 and SuperClac allow you to enter formulae into cells in much the same way as you type a number. However, with First Choice you have to go to the cell and then select 'Type or Edit Cell Formula' from the Features pull-down menu. This opens a window into which you can type your formula. It all seems like hard work to me.

First Choice supports a fairly standard range of mathematical and statistical formulae such as Sin, Cos, Tan, Standard Deviation, and so on, but it doesn't amount to much more than you would get on a good scientific calculator.

One nice feature, however, is that it does support the IF ... THEN ... ELSE control structure along with the 'AND', 'OR' and 'NOT' logical operators.





F YOU OR YOUR STAFF USE A COLOUR COMPUTER MONITOR YOU MUST READ THIS.

Why risk damaging your eyes ermanently by using inferior omputer monitors?

VM offer you the WORLD'S ONLY, ZERO DEFECT MONITOR, with a 20% larger screen, High esolution clarity at a price OU CAN AFFORD.



## ASK FOR TVM BY NAME.

MART BUSINESSES ARE DISCOVERING THESE ADVANTAGES AND BENEFITS OF USING A TVM MONITOR.

TVIM.

14", 20% LARGER, SUPER DARK, NON-GLARE SCREEN. Cuts eye strain, improves clarity, NO daylight squinting.

X-RAY LEAKPROOF DESIGN.

NO radiation damage to eyes.

HIGH RESOLUTION COLOUR or MONO MONITOR.

4096 deeper, brighter colours.

7-COLOUR MONO DISPLAY FEATURE, PLUS WHITE REVERSE

Choose the most comfortable colour.



AUTOMATION

MELBOURNE – SYDNEY – NEWCASTLE – BRISBANE HOBART – ADELAIDE – PERTH – AUCKLAND

14 Whiteside Road, Clayton South, Vic 3169 Tel: (03) 543 7244. Tlx: AA31781 Fax: (03) 543 5230.



NEWLY APPOINTED EXCLUSIVE AUST DISTRIBUTOR

PRICED FROM

\$395

## BRAINSTORM

IBM SOFTWARE	COMMUNICATIONS SOFTWARE	MONITORS
SPREADSHEETS           SuperCalc 4         \$ 675.00           Lotus 1-2-3         \$ 735.00           Perfect Calc         \$ 225.00	Crosstalk XVI	Qubie' Monochrome (Green/Amber) \$ 335.00
Microsoft Multiplan \$ 355.00 Twin \$ 249.00	PROGRAMMING LANGUAGES  Macro Assembler	Thompson Monochrome
DATABASES         dBASE iff plus       \$ 985.00         Reflex. The Analyst       \$ 275.00         R Base 5000       \$1175.00         Q&A       \$ 555.00	Microsoft 'C' Compiler Ver. 4.0 . \$ 899.00 Microsoft Fortran Compiler . \$ 990.00 Forth from BS \$ 325.00 Microsoft Business Basic Compiler . \$ 725.00 CBasic Compiler from Digital . \$ 999.00 Microsoft Basic Compiler . \$ 710.00	Thompson CGA Colour 600x200 51mm Dot
INTERGRATED PACKAGES	Clipper Compiler for dBase III \$ 950.00 Cobol Business Programming	Taxan Vision IV .31mm Dot \$1399.00 Taxan Super Vision with card
Enable \$ 999.00 Framework II \$1075.00 Open Access 2 \$ 899.00 Symphony \$1039.00	Language	00 640x400 .31mm Dot
Knowledge Man 2	FUN AND GAMES	Brother M1409
WORDPROCESSING PACKAGES           Word Perfect         \$ 610.00           Microsoft Word         \$ 725.00           Wordstar         \$ 399.00           Wordstar         \$ 399.00           Wordstar         \$ 600.00           Wordstar         \$ 750.00           Wordstar Professional         \$ 595.00           Wordstar Professional         \$ 595.00           Multimate Ver.         3.3         \$ 739.00           Multimate Advantage         \$ 756.00           Multimate Advantage         \$ 726.00           Perfect Writer II (UK Ver.)         \$ 410.00           Microsoft Word & Mouse         \$ 970.00           PROJECT MANAGEMENT         Timeline         \$ 659.00           Microsoft Project         \$ 690.00           Havard Total Project M/ment         \$ 725.00           Super Project plus         \$ 688.00           Attache' Modules         \$ 665.00           Carpe Accountancy System         \$ 1500.00           Dollars & Sense         \$ 269.00           Effective Business Accounting         \$ 599.00	Ancient Art of War 90.06 Gato \$65.06 Sargon III \$109.06 Jet \$104.06 Flight Simulator \$104.06 Flight Simulator Scenery Disks \$55.06 Zork I \$75.06 Zork III \$89.06 Trinity \$85.06 Ballyhoo \$85.06 Hitch Hikers Guide \$89.06 The American Challenge \$65.06 Balance of Power \$85.06  JX SOFTWARE  Turbo Editor Toolbox \$164.06 Turbo Graphics \$220.06 Sidekick \$164.06 Bank St Writer \$136.06 Wordstar \$187.06 PFS File \$297.06 PFS Report \$297.06 PFS Write \$297.06	Brother Hr35
COMPUTERS	MODEMS	
ATLANTIS PC, XT, & Turbo's form	s from       \$1999.00       Imagineering Le Mod          \$3616.00       Netcomm 1200 in M          \$1699.00       Netcomm 123 in Mo         om       \$2599.00       Netcomm 1234 in Mo	n \$425.00 em \$425.00 odem \$772.00 dem \$1127.00 odem \$1399.00 odem \$1062.00
HARD DISK & HARD CARDS	External Modems from	m
Tamdom 20 Mb 1/2 Height Slimline with Control Tamdom 20 Mb HardPak . Seagate 20 Mb 1/2 Height Slimline with Cont. Qubie 20 Mb 1/2 Height Slimline with Cont. Qubie 20 Mb BT HardPak with DIRI FREE We have 10, 25, 30, 33, 40, 50, 60 Mb HardPak as little as		re C64 Modem \$ 149.00   + 12 manual Modem \$ 295.00   - C64 with Vitel Software \$ 299.00   - Serial RS232c \$ 279.00   - cm 1200 \$ 879.00   - cm 123A + Phone \$ 1449.00   - 2400

Call for free demonstration of VOICECOMMANDER and S.A.M. — the smart answering machine.

#### 00 00 00 0 00 Netcomm Smartmodem 123A + Phone . . . . . . . . . . . . . . \$1449.00 Netcomm Smartmodem 2400 \$1169.00 Netcomm Smartmodem 1234A + Phone . Taihaho External Modem 300, 75/12,600, 1200F/D \$ 345.00 . . . . . \$ 659.00 Nice Modem TWO Sendata 700 Acoustic Coupler/Modem, 300F/D . . . \$ 129.00

**BRAINSTORM COMPUTER PRODUCTS** 

128 Devonshire St, Surry Hills, 2010. Tel: (02) 698 9199, 698 9722. Tlx: 70208 CAMPEX

## computer warehouse

FOR ORDERS CALL (02) 698 9444 MAIL VIATEL TO: 221216220 See Viatel List On '2489 #

#### HARDWARE FOR THE IBM & COMPATIBLES

THAT DON'T THE TOWN & COMMATIBLES	
8087-1 Maths Coprocessor Chip for 10 MHz PC/XT \$ 528	3.00
8087-2 Maths Coprocessor Chip for 8 MHz PC/XT \$ 429	00.6
8087-3 Maths Coprocessor Chip for 4.77 MHz PC/XT \$ 299	00.6
80287-6 Maths Coprocessor Chip for Olivetti	00.6
80287-8 Maths Coprocessor Chip for 8MHz AT \$ 728	3.00
Intel ABOVE BOARD up 4Mb RAM for the PC \$ 699	5.00
Intel ABOVE BOARD up 8Mb for the AT \$ 999	00.6
Qubie' Keyboard separate cursor pad GREAT for LOTUS \$ 299	00.6
Qubie' 6PAK Multifunction card with 384k RAM \$ 435	5.00
Qubie' 6PAK Multifunction card with 64k RAM \$ 368	5.00
S5 Mouse RS232c type \$ 199	00.6
Microsoft Mouse Bus type	00.0
Microsoft Mouse Serial type \$ 340	00.0
The Smart Answering Machine, let your computer answer	
the phone. NOW with a FREE copy of Sidekick \$ 899	00.6
VoiceCommander, TALK to your computer NO KEYBOARD . \$1999	00.6
HYPERAM, 1.75Mb of RAM for your PC/XT (inc. chips) \$ 998	3.00
HYPER-PORT, with Serial, Parallel Port & clock \$ 399	9.00
HYPER-256, Memory expansion board with 256k RAM \$ 195	5.00
HYPER-512, Memory expansion board with 512k RAM \$ 450	00.0

HYPER-256MF, Multifunction board with 256k RAM HYPER-512MF, Multifunction board with 512k RAM HYPERVID, Full Video card including Colour EGA HYPERACE-286, Accelerate your PC to 3-4 times 6MHz HYPERACE-286PLUS, Accelerate your PC to 5 times 10MH	\$	82 124 99	0.0 0.0 9.0	000
ACCESSORIES				
Parallel Printer Cables	S	4	9.0	0
Serial Printer Cables			5.0	0
Serial Interface Cables	\$	6	9.0	0
Diskettes Le Floppy DS/DD, 5 ¼ inch	. \$	4	5.0	0
Fuji 3.5 inch SS/DD Diskettes	. \$	6	9.0	0
Memorex 5 1/4 inch DS/DD in plastic box	. \$	5	9.9	9
Memorex 3.5 inch DS/QD in plastic box	. \$	9	9.9	9
Memorex DC-600A 0.25 inch Data Cartridges (each)	. \$	7	9.5	0
Disk Cleaning Kits for 5.25 inch drives			5.0	0
PRINTER RIBBONS FOR ALL TYPES OF PRINTERS from (Min order boxes of 10 ribbons sorry!!)	\$6	.99	eac	:h
COMPUTER PAPER all sizes shapes and colours from	225	2 00	he	

11" x 9.5" white bond with perforated margins 2500 sheets \$ 15" x 11" blue half shadow 1 sheet x 2500/box . . . . . . . . \$

## SAM Computer Phone Answering Machine and Phone Management System for IBM PC & Compatibles

SAM is an advanced telephone management product, carefully

designed to enhance the effectiveness of your personal communications. The package includes all the hardware and software required to transform your IBM PC into an intelligent telephone answering and voice messaging system.

Besides being a normal phone answering machine some of the features are:

SAM allows up to 999 personal

messages to be retrieved by callers ●
Message forwarding ● Timed delivery of
messages ● Group delivery ● Phone directory from which you can one touch dial up to
250 nos. \$899 inc. tax

## VoiceCommand Voice Recognition System for IBM PC

At last there is available a voice recognition system that provides a 32,000 word capability in 500 word instant recognition segments — all at an affordable price. Simple universal interface:

VoiceCommand creates a universal interface

to operating systems and application programs, translating the spoken word into computer commands for these systems and programs. All PC/DOS and MS/DOS can be used with VoiceCommand.

System allows multiple users and includes a full size system board that simply plugs into the spare slot in your PC, software and a microphone. Possible application are with disabled users, medical field, quality control, checkout counters etc.

We are the authorised sole Australian distributors for above products. Dealer enquiries welcome.

## ORDER FORM Please fill out and return to: Brainstorm Computer Warehouse

128 Devonshire Street, Surry Hills, NSW, 2010

No thanks, but I would like a catalogue for IBM, APPLE.
Please forward the following items overnight.

Product Name
Quantity
Total

1.

2.

3.

Bill my Bankcard/Visa/Master or American Express
DELIVERY \$5.00

Please find enclosed a cheque for \$
Signature:

Name: Mr/Mrs/Ms/Miss

Street:
Suburb:
State
P/code

Most Important: Your Phone Number ( )

Disclaimer: Prices are subject to change without notice (all offers are subject to stock availability). All products carry full manufactures warranty only, no other warranty is implied or given. Delivery \$7.50 on telephone orders

## If he was in business he'd use a Chendai PC. First Choice Purchasing a Chendai PC is commonly definitely very cunning. And used especially during November. Because applications with every Chendai PC purchased all in the same during November we're giving away package - Word Processing, File FREE, a First Choice software package. Management, Spreadsheet Analysis First Choice is ideal for people and Electronic Communications. with more than one need for To collect this FREE offer call software. It combines the four most Chendai.

#### Directory assistant

The Directory Assistant is First Choice's way of shielding the users from the horrors of the DOS command line. It is automatically called up whenever the user wants to load or save a disk file.

The main section of the Directory Assistant window displays a list of the files in the current directory. The files are grouped according to what application they relate to, so word processor files are shown in column one, database files in column two and so on. If there are more files on disk than will fit onto the screen. you can use page up and page down to scroll through. To select a file you simply highlight it using the cursor keys and hit Return.

One good point of the Directory Assistant is that it handles subdirectories very nicely. These are displayed in the right-most column along with any files that First Choice doesn't understand. To move to another directory, you simply select it and press

#### Communications

The communications display looks exactly the same as the word processor screen. Most of the pull-down menus are also the same, although the communications section comes with a few additions to handle file transfer.

First Choice assumes that you are using a Hayes Smartmodem. If you are using another brand of auto-dial modem, First Choice comes with a set of 25 different modem drivers. Unfortunately the majority of these are presently designed for American modems, so you are usually forced either to use a Hayes-



compatible modem or to dial manually. Imagineering, the distributor of First Choice, intends to produce a driver for Netcomm modems "in the near future".

The communications section allows you to set up details for up to eight different dial-up services. Using this feature you can set up the telephone number, baud rate, parity, and so on. After this is done, dialling a system is simply a question of selecting the service from the menu and waiting for the phone service to connect you.

The communications module also allows you to automate the log-on sequence for different services. Unfortunately all that this does is transmit a pre-defined string to the remote system once you get through. Although this works most of the time, it cannot handle bad lines or errors and so cannot be regarded as 100 per cent reliable.

In use, the communications section was quite impressive. The fact that most word processing functions are available within the communications section makes it very easy to play around with the look of text once it has arrived from a remote machine.

The main additions to the standard word processing functions are the ability to upload and download disk files. This can be done either in ASCII for text files, or by using the XModem protocols for transferring binary files between computers.

The only thing that the communications section can't do is handle Viatel graphics or split baud rates.

#### Documentation

As I mentioned earlier, the packaging and documentation were not complete in the review version of First Choice. However, pfs did supply a photocopy of the manual. This was made up of a tutorial section which is designed to be used along with sample files supplied on disk. This is followed by a reference section and handy hints on how to use the system.

Overall, I thought the manual was OK rather than outstanding.

#### Conclusion

I was very impressed indeed with First Choice. Up until now I have disliked every integrated package I have ever come across. I think this is because they generally try to do too much and end up being very complicated and costly.

I like the pfs idea of combining a more than adequate word processor with spreadsheet, database and comms functions which work well without being flashy. The great advantage of First Choice is that it recognises its limitations and doesn't try to do too much. The result is a system which is very cheap. easy to use and which should prove very useful for the 'average' IBM user.

First Choice costs \$474 and is distributed by Imagineering; telephone (02) 662 4499.

## INTERESTED IN **COMMODORE COMPUTERS?**

(C.16, C.64, C.128, Amiga, PC-10/20)

PARRAMATTA (02) 683 4271, NORTH ROCKS (02) 872 4840





## BANKS' STATEMENT



# System crash

Martin Banks is perturbed that we may be placing our very lives in jeopardy through over-reliance on the computer.

Now, this is something about which I don't know too much in terms of specific details. But I know this guy who goes flying quite a bit, who should know more than me.

Anyway, this guy says that he knows someone else; who flies the big jets — you know the type of thing I mean, all wings and engines and three hundred seats with no leg-room. These are beasts which really demand no flying skills at all, these days. As this guy said to me about the subject, it is now possible to fly one of these brutes from Sydney to somewhere interesting by simply pushing six buttons.

Two of those, not surprisingly, are START and STOP.

I reckon I could do that, so I suggested to this guy that maybe I should apply for the job of airline pilot. After all, said I, if I can drive a computer keyboard to write stuff like this, I have definably proved that I can push buttons. *QED*. I am ideally suited and fully trained for the task.

It was then that he pointed out a small, very minor, problem. Not only did I not have a pilot's licence, I have never even flown a plane. I tried to protest that this was not necessary as planes were now controlled by computers, I just had to say when to start and stop... even I could manage that, surely?

That was the easy part, I was told, but what would I do if the computer went wrong and the plane was in high-speed negative elevation mode? My suggestion of combining a rapid scan of the manuals with a lethal mixture of incantations to the goddesses and large gins didn't rate highly as a probable solution to such a problem.

At this point I started to think about the problem just a little. It seemed, or so I was informed, that the way modern big jet airlines are flown these days is by computer. The pilot sits there and pushes a few buttons to make sure it starts, makes some course corrections en route, lands and eventually stops. The pilot's prime responsibilities come down to some relatively easy functions, taxiing the beast around the airport and getting it lined up on the runway, ready for take-off.

After that, the job is simply to monitor the operation of the onboard computers and be there, with lots of expensive training predominantly going to waste, waiting and watching, just in case.

It was then that the thought struck me: this, as they say in all the best movies, just ain't right.

I have in my time flown a good many miles (at someone else's expense, usually) and the thought that I have been sitting somewhere seven miles above the waters of the Pacific while some somnolent pilot just might be forgetting to stay awake long enough to watch the computer have a funny turn, is just a trifle unnerving.

I am not sure that this is the way that computers should be used, mainly because it seems to be turning things upside down and back to front. It is a classic example of how we are making much of computers and their capabilities, and ending up putting all the reliance on them for our own responsibilities.

Up there in the aeroplane it is the computer that is doing the work, and the human being that is doing the monitoring — just making sure that things are going along OK and ready to take over should it prove necessary. Think about that for a second. It can be argued that this is completely the wrong way of doing things. What if the computer that is controlling the plane decides to go all peculiar just as the pilot nods off from terminal boredom?

In practice, it should be the other way Being complete morons, computers haven't got the intelligence (even of the artificial kind) to become bored, so surely, then, tenacity should be utilised to monitor the human being at the controls, rather than the other way round. I have no objection to the computer having the capability of flying the plane should it need to as a back-up to the pilot. I just worry about the idea of the main back-up system being someone who might have a totally numbed brain from nine hours of doing nothing but sitting.

This philosophy of putting so much reliance on comptuers to do everything

for us is starting to appear everywhere, especially as the idea of expert systems catches on. Now, as I have said before in these columns, I quite fancy the idea of expert systems; they are a great way of capturing and utilising precious knowledge.

One of the ways in which such systems can learn, of course, is by actually observing an expert doing a job. In the aeroplane, for example, the system could be programmed to learn what the pilot does and how. Certainly they are already being programmed to fly a plane, but can they be programmed to deal with all emergencies? The answer is probably no, which explains why the human has to monitor the computer.

In the office, the humble PC is already proven as a great boon in any number of ways, but do we actually want it to do our jobs for us? I suppose that when it comes to working out an enormous spreadsheet the answer is probably yes, but that is relatively trivial in the great scheme of what things might be like in the future. A spreadsheet works on much the same principle as using computers to help fly a plane in a 'fly-by-wire' system.

Would we want the computer to not only enter the data into our spreadsheet, but choose which numbers should get the privilege? This is like having a word processor that actually does the writing. (OK, OK, there's no need to comment about that being a good idea. But just think, if the damned thing can write, it can also read, which might mean that eventually it might not require us at all).

All this is to pose the basic question: are we actually using all this wonderful technology we have created in the right way? It would seem that, having discovered that we can produce something that can do a particular job, we then abdicate from that responsibility ourselves. Taken to its logical absurdity, we may well eventually invent ourselves out of life, which doesn't seem to be the best use we can make of the best tool we've made.

END





## TULPI INTELLIGENT MODEM™

## PLUG IT IN AND LET IT FUNCTION

It's yours with a TULPI.

One compact modem, that delivers data communication you can count on, at a very competitive price.

You don't have to have a technical degree to own a TULPI. Just plug TULPI in and let it go to work.

TULPI makes communications **easier**, there's no switches, talk to your TULPI and other modems, from your terminal; more **powerful**, TULPI can communicate with millions of modems worldwide.

We've built exciting features into the TULPI, to make it the right vehicle, for you to access resources you need, just plug it in.

Once you buy a TULPI it's yours for life.

Because it's built like a computer, you can follow the upgrade path your needs dictate.

The TULPI that is right for you today will also be right for tomorrow, as thousands of TULPI owners have found out.

With a TULPI, communicating via computer, will be as second nature as making a phone call.

TO BUY YOUR TULPI FROM TELECORP

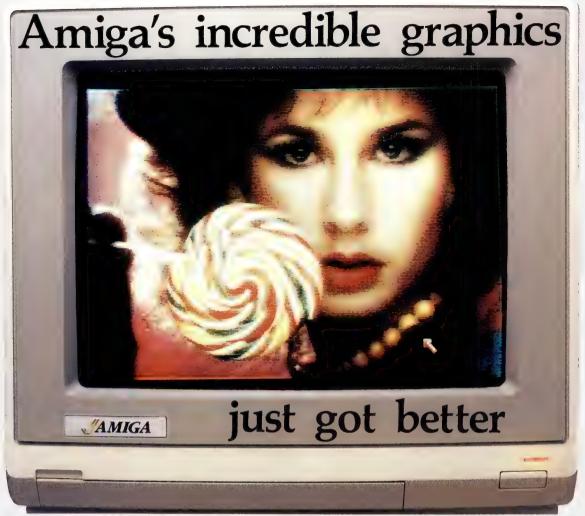
PHONE:

NE: (02) **450 2522** 



A DIVISION OF EFTECH LIMITED

26 Tepko Road, Terrey Hills, NSW 2084, Australia.



Actual unretouched photo.

Aim your video camera and let **Digi-View** capture images with breakthtaking clarity. Then use friendly, on screen controls to adjust brightness, contrast and color for the ultimate image. **Digi-View** uses the **Amiga's** exclusive hold-and-modify mode and sophisticated dithering techniques to display broadcast-quality color photographs. **DigiView's** superb color resolution is made possible by a precision color-separation process that uses color filters (included) and an inexpensive black and white video camera to resolve an amazing 21 bits per pixel, or over 2 million shades.

Available from all good Amiga dealers



P.O. Box 3, Brighton North Victoria 3186 Phone (03) 596 6732 In the monochrome mode, **Digi-View** features resolution of up to 640x400 with 128 gray levels. Special image processing software eliminates flickering and contour effects. IFF disk format lets you transfer pictures to other **Amiga** graphics programs. For scientific image processing or just plain fun, to exploit the full power of **Amiga** graphics, see your **Amiga** dealer or call for your **Digi-View video digitizer**.

Digi-View - Seeing is believing.

Only \$459.95



Capture time High-Res 640x400 Low-Res 320x200 Color Separation 320x200

20 seconds 10 seconds

Requires Monochrome or RGB Camera with 2:1 interlace

Amiga is a trademark of Commodore-Amiga, Inc. © 1986 New Tek

### **SCREENTEST**

#### Number of records

Max no fields Max digits

Special disk format? Link to ASCII files Fixed rec structure Amend rec structure

Link data files No sort fields

Max key length (chars, fields) Data validation Unique keys

Store calculated data

Store selec criteria >/criterion/field Browsing methods Reference manual+ Reference card+

Hot line?

Max records size (chars)

Max field size

Max prime key length File size fixed?

Data types

Fixed record length stored

#### Nc data files open+

No keys

Subsidiary indexes kept up-to-date?

Screen formatting

Report formatting

Totals and statistics Combining criteria Wild-code selection?

Interaction methods Tutorial guide+

Online help+

65.000 17 million

10.254 20

Yes Yes

Only by copying data file

16+

255, unlimited Adequate

Optional (package checks

if requested)

On input (or updating in batch), Batch process to change specified

fields/records Mandatory

Yes

Any key for viewing or editing

Not provided

10,000 255 255

Numeric (inc. decimal point),

character, date, array Yes

16/32

16

Automatically

Default format supplied, paint-a-

Default format supplied, must specify

columns and rows by number

Yes AND

Field must start with specified

character(s)

Menus, full tailoring

Figures in italics for TAS Plus/Developer's Version

#### Fig 1 Features and contraints

number of fields, are relaxed in that version, in many cases through the provision of a fixed area of memory available to the user program but not overwritten by TAS itself. This area of 96k allows you to have much larger records than would be permitted by most packages, but you do have to control its handling yourself, to a much greater extent than if you stick to the basic provisions.

### File creation & indexing

TAS Plus provides three methods of creating a file. The simplest way is to use the 'Create database' option on the main menu; this asks you to enter the name, type and length of each field, and makes entries in the overall data dictionary that defines all the fields in one database. When the definition is complete, TAS Plus creates a basic data file with no records, and allows you to enter records using a default screen layout of one record per line. Subsequently, you may define a data entry screen using 'paint-ascreen' methods. The second approach is to paint the data entry screen first, and to define each field as you go; these definitions are then added to the data dictionary by TAS Plus. Or, using the third method, you can amend the data



- High performance object-oriented programming
- Integrates object-based and rule-based programming with object-oriented Prolog
- A user-extensible, open-ended enviroment
- A responsive graphical user interface Supports exploratory programming and prototyping
- Class hierarchy with inheritance creates highly re-useable code.
- Smalltalk source code included, with browser windows for easy access and modification.
- A huge tool kit of classes and object for building a variety of of applications.
- Object-swapping creates virtual memory on hard disk or RAM disk
- Bit-mapped graphics with bit and form editors.
- A sophisticated source-level debugger. Automatic change log for easy recovery
- from errors. Powerful directory/file browser system for organizing DOS files.
- Optional communications interface to UNIX and other systems.
- Access to other languages and DOS functions.
- DOS command shell.
- Detailed owner's manual designed for both beginners and advanced programmers.
- Not copy protected.

PARADOX . PC TUTORIAL 579 QUICKBASIC ..... \$179 SYMPHONY \$1.150 TURBO PROLOG TURBO TUTORIAL



48 A'Beckett St, MELBOURNE 3000 Phone (03) 663 6580 Mail Orders Welcome

#### BUY DIRECT FROM THE IMPORTERS

**QUALITY JAPANESE PC/XT COMPATIBLES** 



#### PC 8088+ /TURBO PERSONAL COMPUTER

- All Japanese boards
- 640K RAM, expandable to 1MG 8088-2 processor/dual speed
- 2 x 360K National DSDD disk drives
- Multi I/O card with:serial, parallel and games ports, real time clock and calendar and disk controller
- Colour/Mono graphics card
- 180W power supply
- AT style case with Hardware reset & keyboard lockout
- AT style enhanced 100 key keyboard
- Thompson amber or green display monitor

#### PC 8088+ PERSONAL COMPUTER

- All Japanese boards
- 640K RAM, 8088 processor
- 2 x 360K National DSDD disk drives
- Multi I/O card with:serial, parallel and games ports, real time clock and calendar and disk controller
- Colour/Mono graphics card
- 180W power supply

\$1794.00 (inc.tax)

WE NOW

DO MAIL ORDERS

- XT style case
  - AT style enhanced 100 key keyboard
- Thompson amber display monitor

OPTIONS

20M H/disk + \$1150 RG.B. EGA upgrade + \$1190 Hercules/TTL monitor + \$110 Ring us about our Fujitsu hard disk drive sale with controller under \$900

\$1944.00 (inc tax)

Star NX-10	PRINTERS	71 N T 10 N	DISKETTES		
Full range of Super Star Printers Super-5 EP1201 Super-5 ENP1802 Impact Laser 400 Super-5 ENP1802 Super-5 ENP1	Brother M 1509	\$\$CALL	CIS DSDD 5.25	\$	
Super-5 EP1201         \$ 575.00         SOFTWARE           Super-5 ENP1802         \$ 699.00         Norton Utilities V3 1         \$ 165.00           Impact Laser 400         \$ 3994.00         Norton Commander         \$ 135.00           MONITORS         Newsroom         \$ 80.00           Thompson composite amber/green         \$ 220.00         Turbo Lightning         \$ 175.00           Thompson TTL amber/green         \$ 247.00         Turbo Database Toolbox         \$ 99.00           Qubie RGB HR31-200         \$ 880.00         Turbo Graphix Toolbox         \$ 99.00           Qubie RGB HR31-350         \$ 990.00         Reflex: The Analyst         \$ 199.00           Other name brand monitors         P.O.A.         Norton Editor         \$ 199.00           INTERFACE CARDS         Copy II PC         North COMMENT COLLER         149.00           Copy II PC         SALE, 950.00         99.00           Multi I/O (as above)         \$ 199.00         Word Wizard         NC. TAX.         \$ 115.00           Eprom programmer         \$ 190.00         Turbo Gameworks         \$ 115.00           Hercules compatible         \$ 199.00         Turbo Gameworks         \$ 115.00           EGA colour 256K RAM         \$ 550.00         Turbo Gameworks         \$ 115.00	Star NX-10	\$\$CALL	1.2 Mb AT disks	\$	60.00
Super-5 EP1201         \$ 575.00         SOFTWARE           Super-5 ENP1802         \$ 699.00         Norton Utilities V3 1         \$ 165.00           Impact Laser 400         \$ 3994.00         Norton Commander         \$ 135.00           MONITORS         Newsroom         \$ 80.00           Thompson composite amber/green         \$ 220.00         Turbo Lightning         \$ 175.00           Thompson TTL amber/green         \$ 247.00         Turbo Database Toolbox         \$ 99.00           Qubie RGB HR31-200         \$ 880.00         Turbo Graphix Toolbox         \$ 99.00           Qubie RGB HR31-350         \$ 990.00         Turbo Tutor         \$ 70.00           Qubie RGB HR31-350         \$ 990.00         Reflex: The Analyst         \$ 199.00           Other name brand monitors         P.O.A.         Norton Editor         \$ 199.00           INTERFACE CARDS         Copy II PC         WITH CONTROLLER         \$ 149.00           Copy II PC         WITH CONTROLLER         \$ 149.00           Word Wizard         \$ 95.00         \$ 95.00           Multi I/O (as above)         \$ 199.00         Turbo Editor Toolbox         \$ 115.00           Eprom programmer         \$ 190.00         Turbo Gameworks         \$ 115.00           EGA colour 256K RAM         \$ 550	Full range of Super Star Printers	P.O.A.	3.5 inch DSDD	\$	60.00
Impact Laser 400		\$ 575.00			
MONITORS	Super-5 ENP1802	\$ 699.00	Norton Utilities V3 1	\$	165.00
MONITORS         Mirror         \$ 95.00           Thompson composite amber/green         \$ 220.00         Turbo Lightning         \$ 175.00           Thompson TTL amber/green         \$ 247.00         Turbo Database Toolbox         \$ 99.00           Qubie RGB HR31-200         \$ 880.00         Turbo Graphix Toolbox         \$ 99.00           Qubie RGB HR31-350         \$ 990.00         Reflex: The Analyst         \$ 199.00           Other name brand monitors         P.O.A.         Norton Editor         \$ 199.00           INTERFACE CARDS         Copy II PC         WITH CONTROLLER         \$ 149.00           Colour graphics         \$ 169.00         Sidekick         \$ 99.00           Multi I/O (as above)         \$ 199.00         Word Wizard         \$ 115.00           Eprom programmer         \$ 190.00         Turbo Editor Toolbox         \$ 115.00           Hercules compatible         \$ 199.00         Turbo Gameworks         \$ 115.00           EGA colour 256K RAM         \$ 550.00         Turbo Pascal V 3         \$ 115.00	Impact Laser 400	\$3994.00	Norton Commander	\$	135.00
Turbo Lightning			Newsroom	\$	80.00
Thompson composite amber/green   \$ 220.00	MONITORS		Mirror	\$	95.00
Thompson TTL amber/green \$ 247.00		# 220.00	Turbo Lightning	\$	175.00
Qubie RGB HR31-200         \$ 880.00         Turbo			Turbo Database Toolbox	\$	99.00
Ouble RGB HR31-350         \$ 990.00         Turbo Tutor         \$ 70.00           Other name brand monitors         P.O.A.         Reflex: The Analyst         \$ 199.00           INTERFACE CARDS         Norton Editor         \$ 149.00           Colour graphics         \$ 169.00         Sidekick         \$ 5ALE, A CRALY         99.00           Multi I/O (as above)         \$ 199.00         Word Wizard         \$ 115.00           Eprom programmer         \$ 190.00         Turbo Editor Toolbox         \$ 115.00           Hercules compatible         \$ 199.00         Turbo Gameworks         \$ 115.00           EGA colour 256K RAM         \$ 550.00         Turbo Pascal V 3         \$ 115.00			Turbo Graphix Toolbox	\$	99.00
Norton Editor		4	Turbo Tutor	\$	70.00
INTERFACE CARDS   Copy II PC   WITH A CRAP   99.00   Sidekick   SALE   S950.00   95.00   Sidekick   SALE   S950.00   Sidekick   S950.00   Sidekick   SALE   S950.00   SALE   SALE   S950.00   SALE   SALE   SALE   S950.00   SALE   SALE   S950.00   SALE   SALE   SALE   S950.00   SALE   SALE   SALE   SALE   S950.00   SALE		•	Reflex: The Analyst	\$	199.00
INTERFACE CARDS   Copy II PC   WITH A CRAP   99.00   Sidekick   SALE   S950.00   95.00   Sidekick   SALE   S950.00   Sidekick   S950.00   Sidekick   SALE   S950.00   SALE   SALE   S950.00   SALE   SALE   SALE   S950.00   SALE   SALE   S950.00   SALE   SALE   SALE   S950.00   SALE   SALE   SALE   SALE   S950.00   SALE	Other name brand monitors	P.O.A.	Norton Editor	*	175.00
INTERFACE CARDS   Copy II PC   WITH A CRAP   99.00   Sidekick   SALE   S950.00   95.00   Sidekick   SALE   S950.00   Sidekick   S950.00   Sidekick   SALE   S950.00   SALE   SALE   S950.00   SALE   SALE   SALE   S950.00   SALE   SALE   S950.00   SALE   SALE   SALE   S950.00   SALE   SALE   SALE   SALE   S950.00   SALE			Printworks SEAGATROLLE	-	149.00
Multi I/O (as above)   199.00   Word Wizard   115.00	INTERFACE CARDS	4.	Copy II PC	-	99.00
Multi I/O (as above)       \$ 199.00       Word Wizard       \$ 115.00         Eprom programmer       \$ 190.00       Turbo Editor Toolbox       \$ 115.00         Hercules compatible       \$ 199.00       Turbo Gameworks       \$ 115.00         EGA colour 256K RAM       \$ 550.00       Turbo Pascal V 3       \$ 115.00	Colour graphics	\$ 169.00		43	95.00
## 190.00 Turbo Editor Toolbox \$ 115.00 ## 115	Multi I/O (as above)	\$ 199.00	Word Wizard NC. TAX.	1	115.00
EGA colour 256K RAM \$ 550.00 Turbo Pascal V 3 \$ 115.00	Eprom programmer	\$ 190.00	Turbo Editor Toolbox	\$	115.00
	Hercules compatible	\$ 199.00	Turbo Gameworks	\$	115.00
M/function 384K RAM \$ 260.00 Turbo Prolog \$ 165.00	EGA colour 256K RAM	\$ 550.00	Turbo Pascal V 3	\$	
	M/function 384K RAM	\$ 260.00	Turbo Prolog	\$.	165.00

Interested in PC/AT compatibles, CAD/CAM, plotters, digitizers etc. call us now.

DEALER ENQUIRIES WELCOME SALES AND SERVICE BANKCARD, VISA, MASTERCARD EXCEPTED

**CREX COMPUTERS** (IMPORTERS)

66 HERBERT STREET

ROCKDALE, 2216 TELEPHONE (02) 599 1000/599 1700 TURBOLAN (AUSTRALIA)

16TH FLR. 65 BERRY STREET NORTH SYDNEY, 2060

TELEPHONE (02) 959 5705 (02) 214 4008

PRICES ABOVE INCLUDE SALES TAX AND ARE SUBJECT TO CHANGE WITHOUT NOTICE

#### **SCREENTEST**

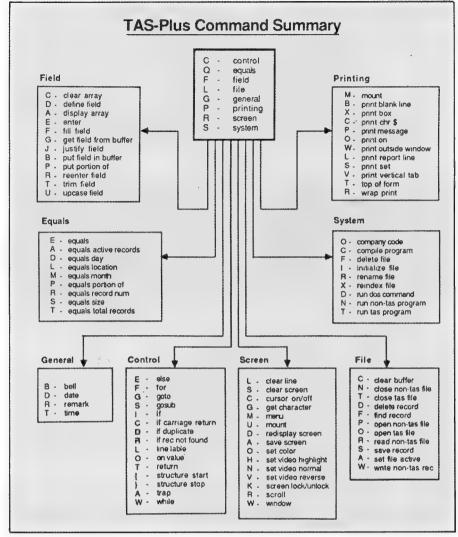


Fig 3 Programming language 'road map'

dictionary directly, and follow it with screen entry design. For a complex application, with several related files, the last method would be the most convenient; the advantage of the data dictionary approach is that you simply need to define a field once, and whenever it is referred to in another file, the definition is recalled.

In any one file, up to 16 keys may be used to index the file. Indexes can be used to recall records quickly, and to determine the order in which the records are retrieved. Keys may be single field, or combinations of several contiguous fields defined as overlay fields. (The restriction to 255 characters applies to the total key length).

#### Data input & updating

Data can be entered onto the default screen layout provided by TAS Plus, or onto a tailored screen defined by the user. The simplest method of setting up a screen layout is to use TAS Plus's program generation capability to set up the necessary program. This allows you to control the layout, and the order in which data is entered. If you want tighter control — perhaps to validate data in detail, for instance by checking that an entered value already exists in another file — you can then amend the program built by TAS Plus, using the internal editor. Screen layout programs can, of course, be built from scratch, but the mixed approach is likely to be faster and less error-prone for most applications.

Records are retrieved for screen display either by scrolling through files in record number order (initially data entry order, though this will be disturbed when records are deleted), or by finding records by key. Key matches may be exact or 'nearest' to the value entered in the appropriate key field. If you begin your search by requesting the first record in that key order, subsequent retrieval of Next or Previous record will fetch

B - binary character
C - close variable file
D - display memory
N - file name search
M - fill memory
F - find rec var file
P - memory ptr update
S - memory space update
V - move string
O - open variable file
K - pop stack
E - print screen
R - redefine field
T - trace enable

Fig 4 Additional commands

records in order by that key.

TAS Plus also provides a 'browse' facility, in which 10 records at a time can be displayed on the screen and amended if desired. You can display all the fields in each record, in which case you cannot select subsets of records, or a subset of fields, when you can also select a subset of records.

Records can also be created and amended under program control. This allows you full control over record handling, either when amending records onscreen, or when changing batches or records without user intervention.

#### Screen display

Without writing your own program, you can display data on the screen in four ways: the default one-record-per-screen format provided by TAS Plus; a 'browse' format in which 10 records are displayed on each screen; a tailored layout painted by the user; and a report format. All but the last allow data amendment; report formats are for display only. With TAS Plus's programming facility, you have full control over screen display, including direct cursor addressing.

#### Reports

Reports in TAS Plus can be sent to a printer, to the screen or to a file. They can contain a maximum of 60 line formats of 128 characters each; by having two formats on one line, you can print up to 255 characters per line if your printer carriage is wide enough. Control characters may be sent directly to the printer, and page formats can be controlled (for example, the number of lines printed per page).

Formatting within the report can be allowed to default to that set up by TAS Plus, using a simple columnar layout, or determined by program, specifying

#### **SCREENTEST**



Fig 2 TAS Plus main menu



Fig 9 Using the editor

columns and rows for report elements. In the default mode, where the program is set up by TAS Plus, you can specify the field or fields used to select records when the report is run, for example to report on the names of all customers who are within 10 per cent of their credit limit. Reporting, like all TAS Plus retrieval operations, is always a two-stage exercise — first the format and selection parameters are defined and saved, then the report can be run as often as you like

#### Selection & sorting

The selection options in TAS Plus are probably its weakest aspect. When using the basic TAS Plus provisions for retrieving records for amendment, you can find records with an exact or inexact match on any key field. For reports, you can select records falling within a range of values for any or all fields (not just key fields); this allows you to report on the records of all customers owing between \$1000 and \$2000, but not on all those living in South Melbourne or Port Melbourne. If you test more than one field, the results are always added together, so that records must pass all tests to be included.

In the programming language you can achieve a little more flexibility, as there is an IF condition THEN ... ELSE construct, where the condition may employ a relational operator, or may use a test for the existence of one string within another. The IF condition cannot,



Fig 7 'Painting' a screen



Fig 10 Using several windows

however, include more than one test, as there is no provision for AND and OR in the condition. To achieve that effect, you would have to nest IFs or use GOTOs. Plans are said to be afoot for inclusion of AND or OR in the next release of TAS Plus, but it is not known when this will be available.

Sorts depend on keys; there is no separate sorting facility. To achieve multiple sorts, you must use overlays — that is, the fields to be indexed must be adjacent in the data file. (Since data may be entered on the screen in a different order from its storage in the file, this is no



Fig 8 The result of painting



Fig 11 Help with screen painting

great hardship, but does require some forethought).

Data retrieved for display or reporting may be in order by one key field or by a set of fields forming a single overlay key field.

#### Calculations

The bulk of TAS Plus's calculation features are provided within programs written directly by the user; within the automatic program generation facilities, the only provision is for totalling in reports.

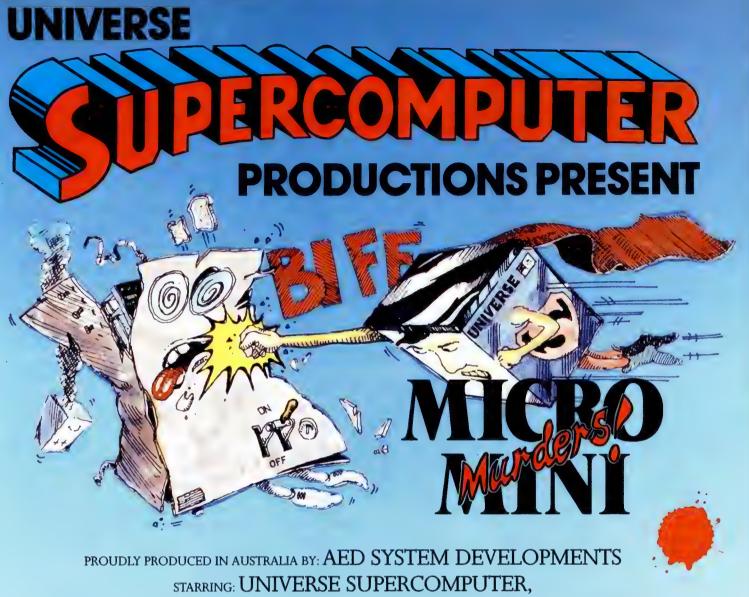
			_
BM1 BM2	Time to add one new record Time to select record by primary key	3secs Inst	
вм3	Time to select record by secondary key	inst	
BM4	Time to access 20 records from 1000 sequentially on three character field (same field as in BM2 key)	43secs+	
BM5	Time to access record using wild-code	53secs	
BM6	Time to index 1000 records on three- character field	8mins20secs	
BM7	Time to sort 1000 records on five-character field	13mins25secs	
BM8	Time to calculate on one field per record and store result in record	115mins3secs	
вм9	Time to total three fields over 1000 records	2mins35secs	
BM10	Time to add one new field to each of 1000 records	3mins	
Time to ir	nport a file of 1000 records: 13mins59secs		

NT=Not tested; NP=Not possible; +=including scrolling. Where two times

are given, first is access to first record, second is access to each

Fig 5 Benchmark times recorded on IBM PC-XT/H

subsequent record



THE MICROCOMPUTER THAT OFFERS SPEED AND FACILITIES APPROACHING A MINI

IN CLOSE COOPERATION WITH: INTEL AND DIGITAL RESEARCH

UNIVERSE, THE AFFORDABLE SUPERMICRO BRINGS YOU THE MULTIUSER/MULTITASKING OPERATING SYSTEM

WITH ALL THE SOPHISTICATED SECURITY FACILITIES.

CO-PRODUCERS OF: MINI POWER AT MICRO PRICES

SUPPORTED BY: 12 MONTHS ON-SITE WARRANTY,

RUNNING: THE WORLD'S WIDEST RANGE OF SOFTWARE PACKAGES UNDER CP/M, MP/M AND MS-DOS

ALSO SUPPLYING THE HIGH SPEED PC NETWORKING SOLUTION THAT IBM CAN'T

Strongly advised for Multiuser/Multitasking requirements. Users needing fast, expandable computer facilities should view a

Universe Supercomputer Production.



Have a productive day, phone or write now for a complete information kit on Universe. **AED System Developments** 

Unit 3, Prospect Industrial Estate, 2 Stoddart Road, Prospect NSW 2149. Ph: (02) 636 7677 **ACT**: (062) 47 3403 **VIC**: (03) 211 5542 **WA**: (09) 450 5888



CONTRACTOR: DOLGAS PANEL PERIOD CONTRACT PE10

#### **SCREENTEST**

Package Dataflex	Cost (\$) 1920/2520	Summary Powerful, flexible database management system available on a wide range of single-user and networked systems. Excellent for system developers, good for novices prepared to apply themselves. Clumsy manual, excellent reference summary and examples
Omnis 3 Plus	949	Probably the most powerful data management system for the Mac. Allows development of sophisticated systems using simple methods, well-integrated with Mac approach. Permits 12 data files open, fixed-length records. Powerful screen layout and reporting
Paradox	1470	Table-based system for IBM PC, many similarities to 1-2-3. Tables can be related. Good querying and reporting, powerful command language. Keeps data in memory if possible: speed on larger tables should be checked. Easy to use at basic, menu-driven level
Reflex	214	Hybrid data management/spreadsheet/ business graphics. All data must reside in memory, but can filter larger database from disk — updates done correctly when file is saved. Very cheap, good importing, so could provide reporting for other spreadsheets
TAS Plus	199/569/86	Secombination of good, basic menu-driven facilities with powerful programming tools make it excellent value for money, especially for novices wanting to learn, and developers wanting economical run-time system

Fig 6 Comparison of similar data management packages

Within the programming language, you can carry out the conventional range of arithmetic calculations, using expressions which are ordered from left to right without any precedence ordering, except that material within brackets is evaluated first. Time and date calculations work correctly, and arrays can be used in arithmetic expressions.

#### Multiple files

TAS Plus is unusually flexible in its provision for multiple files. In the basic package, up to 16 data files (not including indexes) may be open at one time; in the Developer's Version, up to 32 files are allowed. In case anyone thinks this is magic (since the effective DOS limit is 16), what actually happens is that no more than 16 files are ever open at once, but TAS Plus takes care of the opening and closing needed, keeping note of pointers and restoring them when files are re-opened. Apart perhaps from some small time penalty, the appearance is of 32 data files. In practice, most people won't reach the 16 limit, since it is usually the need to include index files in the count that restricts users of other packages.

Linkage between files is accomplished through keys; when you need to retrieve

a related record, you specify the key to be used in the target file. Screens may contain fields from more than one file, and several files may be updated from a single screen.

#### Tailoring

While you can use TAS Plus in a basic way without becoming concerned with tailoring, the package really comes into its own when you use the extensive range of tailoring facilities provided through its command/programming language. These features are extended further in the Developer's Version. The author of TAS Plus previously designed the Sensible Solution database system, and the programming features of the current product bear some of the hallmarks of that system. It has been improved in a number of ways, such as the provision of a more extensive range of control facilities. The 'road map' for the TAS Plus programming language is shown in Fig 3, and the additional menu of commands in the Developer's Version in Fig 4. The latter also provides a variety of extra goodies, including the ability to refer to files by number rather than by (constant) name.

Simple programs may be generated automatically, using TAS Plus's Create

Program and Create Report facilities. There is also a feature that allows you to create tailored menus. More complex programs can be built up from those generated automatically, or written from scratch using a screen editor, and employing drop-down menus to construct programs on a step-by-step basis, which should make life easier for beginners.

The editor provides a good example of what can be achieved in the TAS language — itself a program of over 5000 statements, it allows you to create and edit a program whose source code occupies up to 96k of storage. Larger programs (or the programs of those who believe it to be beneath their dignity to use anything so naive as a menu) can be created with a conventional text editor, and processed with the TAS Developer's Release.

This approach has been used with the suite of programs written in TAS (suitably 'Australianized') to carry out basic accounting functions: debtors, creditors and general ledger are available for \$999; and together with stock control and purchase and sales order modules sell for \$1429. Both packages include a single user developer's version. Since the source of the TAS programs are included, users essentially acquire an accounting suite that they can tailor to their own requirements, including processing their precious data in a variety of other ways — even now a rare feature on conventional accounting packages.

The programming language has only rudimentary procedure facilities -GOSUB, with no parameter passing and the conditional facilities are, as I showed earlier, primitive. But the language does include some features not universally available, such as full control over screen colour, access to the full range of IBM characters including the graphics symbols, a windowing feature allowing you to open windows onto several screens at once (very fast), the ability to amend function keys, and trace and debugging facilities. You can also run DOS commands and the DOS programs with parameters in both cases, so that it would be feasible to set up complete systems in TAS Plus.

#### Links with outside

TAS Plus provides a built-in facility to exchange files with dBase (either format), and also the building blocks with which you can write programs to import and export data in a variety of ASCII text formats. Indeed, the ability to read ASCII files within TAS Plus means that in some circumstances you could



# TULP INTELLIGENT MODEM™

#### PLUG IT IN AND LET IT FUNCTION

It's yours with a TULPI.

One compact modem, that delivers data communication you can count on, at a very competitive price.

You don't have to have a technical degree to own a TULPI. Just plug TULPI in and let it go to work.

TULPI makes communications **easier**, there's no switches, talk to your TULPI and other modems, from your terminal; more **powerful**, TULPI can communicate with millions of modems worldwide.

We've built exciting features into the TULPI, to make it the right vehicle, for you to access resources you need, just plug it in.

Once you buy a TULPI it's yours for life.

Because it's built like a computer, you can follow the upgrade path your needs dictate.

The TULPI that is right for you today will also be right for tomorrow, as thousands of TULPI owners have found out.

With a TULPI, communicating via computer, will be as second nature as making a phone call.

TO BUY YOUR TULPI FROM TELECORP

PHONE: (02) 450 2522



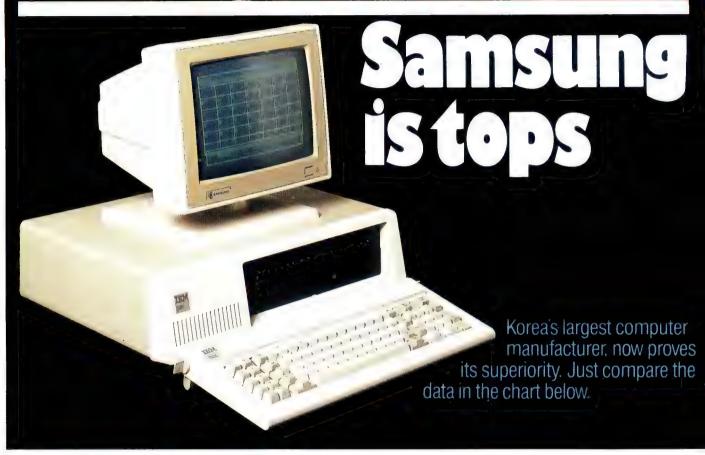
A DIVISION OF EFTECH LIMITED

26 Tepko Road, Terrey Hills, NSW 2084, Australia.

Australian Personal Computer Page 77

OF ALERA ES ENCLIPTED

# HERES PROOF!



#### Feature-Wise Price-Wise Samsung is the best!

Model	RRP (ex Tax)	Tilt Swivel Base Inc.	Anti- Glare Screen Inc.	New Look Flat Screen	Video Band Width	Scan Freq.	Operat- ing Temp.	Weight	Hidden Front Cont.	Heavy Duty Cabinet	Active Display Area
SAMSUNG GR2F	\$225.00	1	1	2	20 Mhz	18.432 Khz	-10°C to +50°C	8.1 kg	1	2	210 mm X 160 mm
TAXAN KX1212	\$335.00	×	1	×	20 Mhz	18.432 Khz	-10°C to +40°C	6.8 kg	×	×	205 mm x 150 mm
ROLAND MA-122	\$262.50	X		1	20 Mhz	18.432 Khz	0°C to +40°C	7.0 kg	X	×	195 mm X 146 mm
QUBIE HR39	\$320.00	1	1	×	20 Mhz	18.432 Khz	-10℃ to +50℃	9.8 kg	×	X	204 mm X 135 mm

#### Proven Japanese Quality Control

Samsung has been working together with NEC since 1977, and with the strictest Japanese quality control, they're rapidly becoming Australia's number one monitor. Small wonder, with a price 20% below that of their nearest competitor.

#### **IBM Compatibility**

There are a number of models to choose from in a choice of flat, anti-glare screen with tilt and swivel base or standard screen. Most models come in either green or amber screen and are compatible with IBM, Apple and most types of computers.

For all your computer needs. we're a must.



350 South Road, Moorabbin, Victoria 3189. (03) 555 3644.

#### Australia's Sole Distributor

Call Amust — Australia's sole distributor for the Dealer closest to you, or Entre' Business Centres at:

Moorabbin (03) 555 6644
Melbourne (03) 525 1288
Crows Nest (02) 436 2333
Sydney (02) 29 7731
Adelaide (08) 232 1222

#### **SCREENTEST**

'milk' the ASCII records of the information needed without actually converting them to TAS Plus format. which could save time and disk space in some applications (for example, local processing of mainframe data).

#### User image

At the basic level, TAS Plus is a menudriven system, using drop-down menus to provide users with choices, and help at the touch of a function key. A user with modest requirements could, with very little effort or previous experience, set up simple systems quickly.

To do more, you must come to terms with the TAS Plus programming language; the suppliers call it that, and I have stuck to their term, since it more nearly resembles a language such as Basic than a command language of the type common to most of the big fish in this market.

This learning process is made much easier by the use of menus to lead you through the maze, and the ability to inspect and modify the programs written by the TAS Plus program generator is a big help. I would expect it to take a bit of effort for people who have never programmed before, but whether the amount of effort would be less or more than learning a command language, I find very hard to judge.

#### Documentation

I suspect that some of my readers regard me as a perfectionist over documentation, and it's true that I do care very much that a manual should be clear, concise, comprehensive and easy to follow. The TAS Plus manuals are adequate, but no more. The first half of the main manual consists of an extensive tutorial, which is above average in most respects: it fails (in common with virtually all American products) to provide a proper overall picture of the TAS approach, the

skeleton on which to hang the details of how it works in practice. The second half is the reference section, of which the best thing is the 'road map' reproduced as Fig 3. The text seems to be aimed at programmers, yet has no formal syntax definitions; it essentially falls between two stools, being too terse for novices, too imprecise for experts.

The manual for the Developer's Version follows similar lines; for example, the explanation of multi-user features is split between two sections. and some things seem to have slipped through the gap. (Perhaps it is worth putting in a plea for more redundancy appropriate repetition — in documentation; systems people rarely see the need for it, but then they have not spent hours wishing they had four thumbs to keep all the relevant sections open at once, and a crystal ball to guess at the gaps between the various parts of the overall explanation).

On the plus side, the manuals are typeset, and light and small enough to be genuinely portable (I'm seriously thinking of buying a luggage trolley to take the weight off my arms when lugging about the three hard-bound volumes most suppliers find it necessary to provide, presumably on the principle of 'never mind the quality, feel the width'). The tutorial section is OK, and there is a good index.

#### Conclusion

For its price, TAS Plus (and its extended versions) have to be excellent value for money. The paucity of selection facilities. and the awkwardness of parts of the programming language, will deter some, while the absence of an extensive library of numerical functions will rule out applications heavy in calculation. The ability to compile tailored programs, especially for system developers who wish to protect their investment, is a large bonus. END

#### Summary

Supplier:

**CPS Systems** (08) 223 6222

Telephone: Cost:

\$199/\$569/\$869

Version reviewed: 2.04 Type:

S,E

Features:

Basic features offer simple data entry and reporting from flat files using menus. Powerful programming language

provides a wide range of commands to process up to 16 open data files linked by keys. Windows, Compiler,

Networked version, Developer's version.

Drawbacks:

Selection criteria limited; no AND or OR in programs. No

parameter parsing or external subroutines.

Ease of use:

Basic system good for novices, gives gradual lead-in to programming. Some commands in programming language

rather cumbersome



# **ProgramEd**

BRIEF offers the features MOST ASKED FOR by professional programmers. In fact, BRIEF has just about every feature you've ever seen or imagined, including the ability to configure windows, keyboard assignments, and commands to YOUR preference.

Every Feature You Can Imagine.... Compare these features with your editor (or any other for that matter).

Fast

• Full UNDO (N Times)

Edit Multiple Large Files

• Compiler-specific support, like auto indent, syntax check, compile within BRIEF, and template editing

Exit to DOS inside BRIEF

Uses all Available Memory

Tutorial

Repeat Keystroke Sequences

15 Minuté Learning Time

 Windows (Tiled and Pop-Up) Unlimited File Size -(even 2 Meg!)

Reconfigurable Keyboard

Context Sensitive Help

Search for "regular expressions"

Mnemonic Key Assignments

Horizontal Scrolling

Comprehensive Error Recovery

 A Complete Compiled Programmable and Readable Macro Language

EGA and Large Display Support

Adjustable line length up to 512

The Experts Agree.... Reviewers at BYTE, INFOWORLD, DATA BASED ADVISOR, and Dr. DOBB'S JOURNAL all came to the same conclusion - BRIEF IS BEST!

#### SOFTWARE

C COMPILER (MICROSOFT) ... \$780 COPYWRITE CP/MULATOR ..... \$115 D BASE III+ \$980 MACRO ASSEMBLER ...... \$335 MICROSOFT MOUSE



48 A'Beckett St, MELBOURNE 3000 Phone (03) 663 6580 Mall Orders Welcome

#### **Programmers:**

Turbo-charge your productivity with PL/PC

(Programming language for the PC)

- 3-5 times more productive than using conventional languages.
- Full APL array operators (including matrix inversion and FFT).
- Integrated Programming Environment.
- Modern control and subroutine structure.
- Local subroutines and variables.
- More than 130 built-in mathematical and graphics subroutines.
- One conceptual numeric type (including complex numbers).
- · Large memory model.
- · Source-level debugging.
- Auto-paragraphing.
- Built-in full-screen text and data editor.
- Virtual file variable of up to disk capacity.
- Local support via fax, phone and mail.

See quick reference guide on page 169 of October APC

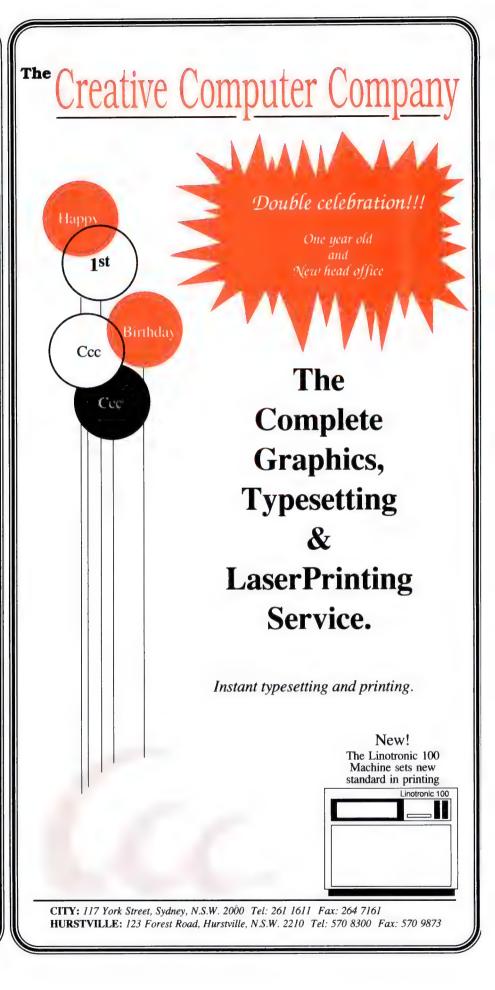
For only \$159 Demo version \$9

#### Requirements:

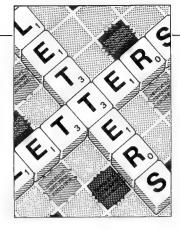
IBM PC or compatibles DOS 2.11 or higher 360K bytes memory

#### Creative Computer Software

117 York St., Sydney, NSW 2000 Phone: (02) 261 1611 Fax: (02) 264 7161



#### LETTERS



This is the chance to air your views — mail to 'Letters', Australian Personal Computer, 2nd floor, 215 Clarence Street, Sydney 2000. Please be as brief as possible and add 'not for publication' if your letter is to be kept private.

#### T-time

With reference to the (entirely justified) rantings of Mr Kewney in respect of 'A Mess DOS' (APC, August) and the inferences drawn with regard to the Strategic Defence Initiative, if one makes allowance for the typographical omission which seems to plague every reference to it by its popular name, the Start Wars programme can be seen as eminently suited to its purpose.

M Radmore

A good point, not to mention a long sentence.

# Intelligent reply

I wanted to bang off a short, sharp reply when I read David Levy's introduction to artificial intelligence (APC, August), but because he goes into such detail, I felt I had to. Sorry about this, but as one who'd like to see intelligent machines about the planet — and who paid good money to read 'Wise moves' — I take exception to just about every single word written.

Without looking it up I suggest that his dictionary equates intelligence with perception, but there are dangerous differences between levels of perception. It seems to me that David Levy has blundered straight into one, because the entire thrust of all the detailed examples in his argument deal with accomplishment, which is largely

irrelevant, and ignore real understanding.

To say that a thing, or person, demonstrates any real intellectual prowess because it or he or she responds correctly to a given situation, on or off the chess board, is nonsense. All that has been demonstrated is the ability to respond correctly, as when a push on a button causes a doorbell to ring.

Intelligence will be demonstrated by the ability not to recognise, but to explain the situation, the response, and the relationship between them.

It might be reasonable to assume that chess masters are highly intelligent, but may we not also assume that either of the two programs mentioned would at the same level of play show a higher consistent success rate that its creator, because it is not prone to his human errors? But you will not then conclude that it is more intelligent.

It is in developing his argument from the spurious premise of the intelligent chess programs that Levy wanders way off the track. Quote: '... a human who plays chess well, composes music, writes poems, or can prove theorems in logic, must be intelligent,' we are told, but it is really only the proving of theorems which counts.

Chess, as we have seen, music, sadly, and, even, as we are later shown in 'Woman, why do you create your face...', something akin to poetry can be programmed, but verbiage is not poetry and there is all

the difference in the world between being able to solve problems and being able to prove theorems.

The Turing test is a nonsense since it will happily 'prove' that the machine is as intelligent as its creator, which we know is not the case. That a given subject thinks the machine understands her well, proves nothing.

Many aspects of intelligence should be distinguished, but the ability to achieve an impressive result takes us back onto spurious ground — unless perhaps you will have that he is more intelligent who can kick a footy further.

Leaving aside the effect of the infinite monkeys typing Shakespeare on the degree to which creativity measures intelligence, let us follow Levy's 1978 championships.

However beautiful the result, the test for intelligence is not whether one machine can beat another, but whether either of them can explain how the result was achieved — or even the basic rules of the game. I suggest that neither can.

Since I'm not allowing the Turing test, the Pfleger deception also fails and we move on to popularity — a great test of truth as every FlatEarther could have told us centuries before there were such machines.

There are many measures of creative art but if the selected poetry readers had been of significant numbers, or qualified to judge, we would still be left with the simple fact that the program did nothing more than follow strict rules laid down by its

creator.

Up to this point the issue has been obscured by the question of *impressive* results, when *meaningful* results should have been our object.

As it happens I do think there is a lot of point to research into the 'machine mind', but we will have achieved artificial intelligence only when the artefact can respond in a fashion not predictable within the initial constraints of its programming, as well as its knowledge, through either experience or inspired thought.

If, however, the search is really for that which Levy describes, then the seekers must have been reading a very strange dictionary.

R Goodwin

R Goodwin

#### Guy, Guy, Guy...

I was most amused by Guy Kewney's comments on 'A Mess DOS' ('Newsprint', APC, August) but find it difficult to sympathise with his problems, or his conclusions.

I, too, have been using MS-DOS for several years. I have even been known to train clients in its use; in my experience, a modicum of common sense can make a colossal difference to the results obtained — an observation which is equally true of every other aspect of computing.

Taking each of Guy's points in turn, it seems unduly harsh to claim that MS-DOS 'sabotages' the

#### LETTERS

GEM mouse. MS-DOS was around long before GEM, and the failure of GEM to integrate properly is surely due to Digital Research rather than to Microsoft. Using the same reasoning, the dangers of 'FORMAT' when using the Xitan shell suggest that it is Xitan which is at fault. Any user planning on formatting a disk will either have used this command before, and know the correct syntax, or will not have used it before. and should look it up in the manual. Anyone who issues a command to a computer with no idea of how it operates deserves all he gets.

I was surprised to hear of a Microsoft program called 'ST' or 'PQ'. I take it that this was nothing to do with MS-DOS, since I can find no two-digit commands in my DOS manual and only one two-digit sub-command ('IF') which is blatantly self-explanatory.

Guy's prose really begins to soar when he reaches the subject of 'RMDIR', an innocuous enough command. My MS-DOS manual is for the IBM PC version 2.1, and being a simple sort I normally start with the 'Contents' page, rather than the 'Index'. The list of DOS commands fills exactly one page, and gives 40 commands. Each abbreviation is followed by a plain English translation in the format: RMDIR (Remove Directory) Command . . . 2-132. With just 40 commands to check, I don't see that you need to know this in advance.

Even if I did not want to look for 'Delete Directory' or 'Directory, Delete' in the Index, my Index gives me (on the same page and in the same column) 'deleting a directory 5-10' and 'directory, remove 2-132'. Look up either command, and it will tell you that the directory must be empty if the instruction is to work. The syntax for both commands is clear, and is a million miles away from a

medical insurance claim form. Guy's complaints yet again say nothing about MS-DOS, but speak volumes about Olivetti documenta-

Moving on to the creation of a file called 'FRED' when there is already a directory called 'FRED', surely all this proves is that Microsoft feels no need to state the obvious. To consider this a fault of MS-DOS is quite ridiculous; I have direct experience of nearly a dozen types of DOS and none of them will allow you to do this unless the file is created inside a sub-directory.

I should stress that I have no connection with Microsoft, nor have I any particular reason to take up the defence of the product. But I do feel that, if you are going to criticise MS-DOS. you should make an effort to do so on better grounds than Guy Kewney's. When I am training a client in the use of MS-DOS, I normally start by saying: 'This is going to be easier than it looks,' and the client usually agrees with me by the end of their lesson. An overcritical and badly-reasoned article such as Mr Kewnev's doesn't help me in my job, nor does it help the thousands of users across the country who have little choice but to use MS-DOS.

If only to show that I have nothing against Guy personally, I will finish this letter by stating my complete agreement with his comment on the Star Wars software — I wonder what the response time is for 'software support' after a program crash in geostationary orbit?

Jack Nicole

# PCW8256 angled text

My article on GSX Graphics with the Amstrad PCW8256 ('Graphic Design', APC, July) omitted to describe how to select the different directions in which text may be

printed. The required SET function is listed in Table 1 of the article and needs CONTROL%(0) set to 13 and CONTROL%(1) to 0. It also requires three values to be passed to GSX in the array PAR.IN% and they are rather complicated. If the four allowed text directions are denoted by a variable 'u' which can take the values 1,2,3 or 4, then the following assignments are needed:

PAR.IN%(0) = (u - 1)\*900PAR.IN%(1) = 100\*(u MOD 2)\*(2-u)

PAR.IN%(2)=100\* (1-u MOD 2)\* (3-u)

I shall not attempt to justify these expressions, but if they are entered as shown and followed by a CALL to GSX as described in the article, they will allow any of the four directions to be chosen.

R Gilmore

# Cryptic comments

A Simpson is absolutely right in his suggestion for eliminating the bottleneck in my Enigma program ('Enigma variations', APC, June). My first thought on seeing his letter (September, APC) was to say: Why didn't I think of that? The only excuse I can come up with is that I was too close to the problem (ves, I know that sounds like a lame excuse but it was the best I could think of). Seriously though, I would suggest that anyone experimenting with the program should incorporate Mr Simpson's ideas.

He may be interested to know that I have been spending my time writing an assembly language cipher program (ULTRA) which is based closely on the Enigma method but with some of the bad points of Enigma removed. In particular, the self-inverse feature of Enigma, a major weakness, has been removed by the use of separate input and

output plugboards. I have also included a few nice touches such as word-wrapping of plain text and formatting cipher text into four character blocks.

Although ULTRA is not yet finished, the speed improvement, even without the inclusion of Andrew's technique, is surprisingly large—the program will encipher 1024 characters in two seconds!

For any readers who are working on cracking the challenge text included with my article or who have already done so, then they will be able to decipher the following piece of cipher text which was enciphered using the same machine setting: IHEFMCEVMPNNUPVPLL LGZKU\*LCLHYKBBM. It is, the title of a Latin text produced by the early Christian Church.

Of course, writing a decryption program is more difficult than writing a cipher program, but if anyone can come up with a decent program, then I'm sure many readers would be interested in the method used.

Colin Davies

# Out for the count

I trust you will agree that in mathematics, above all other disciplines, accuracy is of the greatest importance: Mike James's article (APC, September) contained a whopping great howler, where he explains the 'real' numbers. They are indeed 'uncountable' in strictly defined mathematical sense, but his statement that their ... most important property is that given two real numbers, there is always a third that lies between them' does not imply uncountability. The quoted property is shared by the so-called rational numbers (='common fractions') which are countable, as any competent mathematician would confirm.

One says that the set of all

# MCROS



Now there's an exciting new world for Personal Computer owners to explore. The world of Microtex 666 on Telecom Viatel.

All you need is a 1200/75 baud modem, the appropriate software, and a telephone line, and your PC will be ready to go.

Suddenly you'll be able to shop for software on your PC, and actually download it directly through the Viatel system. You'll be able to get PC advice and tips. Even place messages on the system for other Viatel users to read and respond to – literally a PC talkback service that lets you have a say on almost any subject.

That's just part of what Microtex 666 offers. And Microtex 666 is just part of what Telecom Viatel offers. You can also bank with Viatel, place bets, buy and sell shares, book travel, and much more. Instantly, easily, economically. 24 hours a day.

Ask for a free brochure at any Telecom Business Office. And start using your micro in a whole new, better way.



# Compatible with you know who. Priced as only we know how.



The New Amstrad PC 1512. It uses all the same famous software as the IBM\* PC.

Now you can have a compatible PC at an incomparable price. From around \$1499 you can have 512K of memory, a monochrome monitor with single disc drive, a keyboard, a processor and a mouse. From around \$2349 you can have the same system with a double disc drive and full colour monitor. A total of 8 models will be available.

Also included are Microsoft MS DOS 3.2 and Digital Research DOS Plus operating systems, together with the "GEM Graphics Environment Manager," "GEM Desktop," and "GEM Paint" software (all from Digital Research) and Locomotive "Basic 2" software.

All Amstrad PC 1512s offer standard features that are pricey extras on most other PCs. Like 16 colour graphics for example (many PCs only offer 2). Even the black and white monitor gives you 16 shades of grey. What's more, the Amstrad will run your IBM PC software considerably faster than a standard PC.

You can link your PC 1512s to moderns, network them, or up-grade them with printers and 10 or 20 megabyte hard disc drives. The PC 1512

is distributed and guaranteed throughout Australia by Mitsubishi Electric AWA and sold through leading department stores, retailers and computer specialists. Now there's a computer for

every business at a price every business can afford.

\*IBM is the trademark of International Business Machines Corp. MS DOS is the trademark of Microsoft Corp. DOS Plus, GEM Graphics Environment Manager, GEM Desktop and GEM Paint are trademarks of Digital Research In-Lecomotics WHASIC 2 is the Trademark of Locomotics Solitoner LIA

Please send me more information about the PC 1512.

Name
Company Name:
Address.

Tet

ANSTRAD PC 1512

Part Tot Mitaukichi Floateia AWA P.O. Park 11 Pudalmana NSW 2116

#### LETTERS

rational numbers is dense, cf Mathematical Analysis, by T M Apostol (Addison-Wesley Publ Co Inc 1974) on p68. For a demonstration of countability (or 'denumerability') see What is Mathematics? by R Courant & H Robbins, OUP, 1941, p79). The next three pages give Cantor's famous proof that the real numbers are not denumerable — that is, they are uncountable and also dense.

Ed Rosenstiel

# A Clayton's Prolog?

While not claiming to be an expert in the use of the Prolog language, I was under the impression that one of the fundamental properties of Prolog is its ability to manipulate both facts and rules as part of the database.

This property is essential to the use of Prolog as a language for programming artificial intelligence applications which require the ability to 'learn' by deducing rules from facts and adding these new rules to the database.

In your 'Screentest' of Turbo Prolog you state that "One of the only restrictions found in Turbo is that only facts can be altered dynamically, not rules".

Surely the lack of such a fundamental property in the Turbo language makes it misleading to call it Prolog?

I realise that this raises the whole hoary question of language standards, but surely one must draw the line somewhere when the basic uses of a language are compromised.

R Thorpe

While also not claiming to be an expert in Prolog, I must say that I believe Mr Thorpe makes a valid point. The ability to dynamically alter the knowledge and rule base is certainly a crucial feature in many

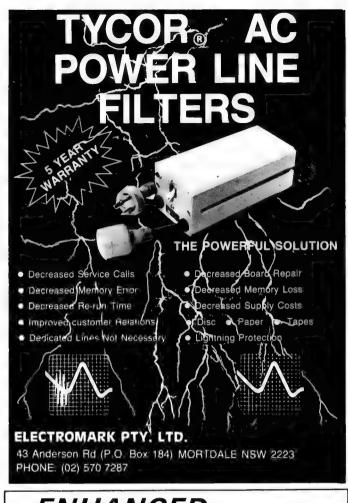
applications of Prolog.

While Turbo Prolog does implement most of the features described by Clocksin and Mellish (Springer, 1981), the two most noticeable omissions are the one mentioned above, plus the inability to define your own infix operators. However, in fairness to Borland, one must also point out some of the good features it offers above and beyond the early Prolog standards, These include 'normal' arithmetic expression notation, retention of variable names and, of course, the fact that Turbo emits compiled code.

Perhaps these additional facilities do not compensate for the lack of a feature which Mr Thorpe feels comprises the language to such an extent that it is no longer 'Prolog'.

However, one must recognise Turbo Prolog for what it really is. Turbo, I believe, is one of the most accessible and usable versions of Prolog available today. Turbo will end up being a vehicle through which today's programmers obtain an appreciation of logic languages. Although dynamic rules may be very important for particular real world applications, the lack thereof should not adversely affect Turbo Prolog's success in exposing newcomers to Prolog. The rules embedded in the program can, of course, be changed, so additional rules have to be added through program alteration and recompilation. It is only the Asserta and Assertz predicates that are limited to facts.

In some ways, Turbo
Prolog will have served a
useful purpose even if
nobody builds a major
application with it. On the
other hand, however, I
believe that it is possible to
create a useful application
without these features. The
natural language query
system provided with Turbo,
although not terrific, is
testimony to this.







It's the same old problem. You need top performance from every terminal, but the budget just can't stand it. Here's a solution. Qume terminals from C&PA. There's a model that will give you the performance you need at a price you can cope with. From straightforward data entry to demanding graphics, there's a Qume VDT to solve your problem.

#### The OVTII9 PLUS No other ASCII terminal even comes close.

Unequalled power and sleek ergonomic design in one package. The ultimate high-end terminal, the QVTI19 has a full range of emulations, including the ADDS Viewpoint A2, Wyse WY-50, IBM 3101 and TeleVideo 910+, 920, 925 and 950. But it doesn't stop there. The QVTI19 PLUS has a 132 column display with horizontal scrolling. Four pages of memory are standard. Both embedded and non-embedded attributes. 26 lines. A split screening for handling dual hosts. 44 host/user programmable functions. Up to 255 characters on one function key. And the ability to use its powerful native mode features while emulating another terminal.

The QVTI19 PLUS is human engineered for easy, stress free use. A height-adjustable keyboard. Round function keys instead of square. Pastel colour coded break, escape and clear keys for easy identification. A 35cm non glare tilt/swivel screen in green or amber. Its compact design blends easily in any office and takes up minimal desk space.



#### The QVTI0I PLUS Unbeatable value

The usability and compatibility of an expensive terminal at a competitive price. That's the QVTI01 PLUS, With full emulation of the ADDS Viewpoint A2, Hazeltine I500, Lear Siegler ADM-3A and TeleVideo 910, 920 and 925 it will get working straight away. And the other standard features will really impress you. Four pages of memory. 16 function keys. 44 programmable functions. Block mode. Screen saver. 35cm non glare screen. Bi-directional printer port.

And all this functionality comes in a sleek, stylized case that's easy to use and easy to look at. And it's all easy to pay for.

#### The QVT202. True VT220 emulation. Better looking. Better price.

The Qume QVT202 ANSI terminal is a true DEC VT220 emulation. With an identical keyboard layout. With far better emulation, more features and better quality for the price than other VT220 emulating terminals.



#### C&PA. Around the country.

**Qld.** 25 Harvton Street, Stafford 4053. Tel: (07) 352 5788 **N.S.W.** 9 Pioneer Ave., Thornleigh 2120. Tel: (02) 848 8533 **S.A.** 65 Manton St., Hindmarsh 5007. Tel: (08) 46 4062

Vic. 25 Hardner Rd., Mt Waverley 3149. Tel: (03) 544 3444
W.A. 110 Charles St., West Perth 6005. Tel: (09) 328 1533
A.C.T. Unit I, G3A Pirle St., Fyshwick 2609. Tel: (062) 80 4041

# "Now you can stop trading off performance against price in VDTs."



In fact the QVT202 features better ergonomics than the VT220. The durable HI-RESPONSE capacitive keyboard has superb feel, the 35cm non-glare tilt swivel screen is easy on the eyes and an exceptionally compact and stylish case adds to the productivity of this terminal.

#### The QVT5IIGX. Shape your ideas in brilliant colour.

Qume's new raster-scan terminal brings colour graphics and alphanumerics within the reach of every professional using a computer. Both graphics and text can be displayed simultaneously – each in up to eight colours selected from a palette of 64.

And the QVT5IIGX gives you full

and the QVISIGX gives you full colour graphics for less than comparable terminals. It's the easy, low-cost way to add colour to management presentations, financial analyses, process control and industrial automation.

It's fully compatible with the Tektronix 4105 colour terminal. It can also be used in Tektronix 4010, 4100 and 4110 series environments.

And of course it has Qume's ergonomic design and proven record for reliability.

#### C&PA for national sales and support.

No matter which Qume terminal you buy from C&PA they all have one thing in common. National support. For sales, installation and advice. Anywhere in Australia, if you need help we'll be right there.

For full details and a demonstration, call your nearest C&PA office today.

Comparing it to Micro Prolog and Prolog-86 clearly shows the superiority of Turbo Prolog for the newcomer. These other implementations have no trouble providing dynamic rules since they are totally interpretive. Turbo, of course, is completely compiled into native code and as such, applications can be distributed without runtime licences.

Perhaps people with experience in Prolog, as Mr Thorpe seems to have. should look elsewhere for their preferred Prolog. However, it would be interesting to see how many Prolog connoisseurs are tempted back to Turbo by its usability, features, speed and price.

Ian Davies

#### **Synaptic** follow-up

With reference to the article in April 1986 issue of APC titled 'Simulating Synapses', I would appreciate details of where this information can be found in literature (eg. a

bibliography). You note that research is being done in the area and I am interested in following up the topic. Any help you are able to provide will be gratefully received.

R McArthur

More information can be found in "Introduction to Artificial Intelligence" by Phillip Jackson (Petrocelli, 1974); the various works of Roger Schank of Stanford University; "The Shape of Intelligence" by H. Chandler Elliot (George, Allen & Unwin).

Research is currently being undertaken by (among others), Geoffery E. Hinton of the Carnegie-Mellon University, Pittsburgh; Jerome A. Feldman of the University of Rochester; Dr. John K, Stevens of the University of Toronto. Additionally, a company called Nestor Inc. in Providence, Rhode Island, is said to have a commercially marketable product using self adaptive pattern recognition neural networks which they plan to apply to handwriting and voice recognition problems. Ian Davies

END



'Thanks to computers we don't have to manhandle radioactive waste at all now."

## RECORD MASTE

The affordable Data Base Program for Apple II/IIe/IIc

A versatile, full featured, menu-driven Data Base Program that is ideal for the office, home or club. Runs on 48K or 64K RAM and one or two disc drives without any disc swapping.

Comes complete with easy to understand, comprehensive manual and tutorial data file to get you started quickly. You can be creating your own data files in 15 minutes or less.

The program allows you to carry out such complex. tasks as printing user-defined reports, performing multi-level sorts, and multi-field calculations. Plus, much, much more.

A truly remarkable product at an even more remarkable price . . .

#### ONLY \$89.95 PLUS \$2.50 P&P

Send your cheque or money order (large SAE for literature) to the sole Australian agents

## RAM SUPPLY PO Box 950, Parramatta. 2150

Telephone (02) 636 8248 \*BY BRIDGET SOFTWARE, USA



- IBM' Color Graphics Adapter (CGA) IBM' Monochrome Display
- Adapter (MDA) Supports Light Pen
- Supports Monochrome & Color Modes 640x350 Monochrome. 720x348 Monochrome
- 640x350 more than 64 colors 640x200 more than 16 colors
- Supports 256K bytes of memory using 64K x 4 Drams RAM on board.



16-20 Edmondstone St. NEWMARKET QLD 4051 Phone (07) 356 7866 Fax (07) 356 8086 \*IBM, PC, XT are registered trademarks of International Business Machines Corp

# 39499 turns your brainbox into a chatter box.

If your computer keeps to itself why not introduce it to the Microtex Communications Package for IBM and Compatibles. Microtex is a versatile data communications package that opens a whole new range of possibilities using your telephone!

Microtex gives you access to Viatel, Microtex 666, travel, banking, telex, airline fares & schedules, electronic mail, bulletin board, telesoftware downloading (100's of programs to choose from) and much much more.

The Microtex package at \$399, (save \$100 on our christmas special) includes modem, push button handset, videotex communications software, free subscription to Microtex 666, terminal communications software (communicate 300/300 to any computer or bulletin board), plus a comprehensive manual with simple onscreen instructions — and it's all Australian made.

SPECIAL CHRISTMAS OFFER!

better hurry

To order or for more information simply phone our hotline

(03) 419 0300

**Information Solutions** 

31 Victoria Street, Fitzroy Victoria 3065

#### YANKEE DOODLES



When a user loses money due to faulty software, who's to blame? David Ahl presents his evidence in this month's US report.

#### Whose fault?

Can software makers be held responsible for a user losing money because of a glitch in the software? Software makers say 'no', but a landmark case is going to trial that has software makers very nervous.

James A. Cummings Inc, a construction firm, prepared a bid for a Miami office-building complex using Lotus Symphony. The preparer omitted \$254,000 in general expenses and, when he realised he had done so. inserted it as the top line in the column of cost figures. The figure appeared on the screen and the printed bid, but it was not added to the total because it was outside the range of the summation formula. The lawsuit states that this was unknown to Cummings at the time and seeks \$254,000 in damages from Lotus Development Corp. Lotus contends, of course, that Cummings made the error and that it (Lotus) has no responsibility.

In general, software makers contend that they can't be held responsible for a user losing money because of a glitch in their product or instructions, "No software maker has represented that their software product is perfect — there are too many ways it can go wrong, and we tell people we can't take that responsibility," says Geoffrey Berkin of Ashton-Tate.

Today, most software packages come with 'as is' warranties which don't even provide for the correction of flaws in the software. Other warranties, including that of Lotus, say the company will only replace a defective disk.

These limited warranties are part of a licensing agreement used in software purchases under which the buyer doesn't own the program, but licenses the maker's property. Thus, software makers have said that a buyer can't sue for flaws in a product he doesn't own. Most packages state that buyers

agree to the conditions of the limited warranty when they remove the plastic 'shrink wrap'.

Nevertheless, there is growing sentiment that software makers must accept some responsibility for products that are promoted as time and money-saving tools for businesses. 'If software doesn't perform in accordance with its specifications, a company should be liable because they're selling a sophisticated product and they intend people to rely on its performance, says Robert Arkin, vice chairman of the Minnesota Software Technology Commission.

#### Kits revisited

In the mid-70s, personal computers came in kits. The basic box contained nothing but a power supply, a front panel with lights and switches, and an empty bus (with as many as 24 slots). Yes, no motherboard everything plugged into the common bus; CPU, memory, video interface, floppy disk controller, printer interface, and so on. Upgrading was simple. When a Z80 CPU came along, you simply pulled out your 8080 CPU card and plugged-in the new one; likewise with memory or disk controllers.

But then came the Apple, Pet, TRS-80, Kaypro, IBM PC and clones, et al, with a mother-board containing the CPU, some memory, and possibly controllers and interfaces. When a machine of this type is superseded by a new model, you must scrap the old computer and spring for a new one. Sure, prices are coming down, but therer is still a fair chunk of hardware that is duplicated.

But now, along comes
Computerland with its Koreanbuilt BC 88 with *no* motherboard. Brilliant! By using the
bus concept with a beefy 150watt power supply, the BC 88
eliminates as much of the builtin obsolescence as possible. The
same box can start as a PC, and
a year later migrate up to an XT
or an AT. It can go from black
and white to colour, and, of

course, easily absorb more memory. It can be an 8086 machine or an 80286 machine. Whatever you need or want it to be, it can be. And since the most common perception of the electronics industry is that 'next year it will be cheaper because it will be obsolete', this machine is a philosophical and marketing breakthrough.

The implications for thirdparty manufacturers (and customers) are tremendous: upgrade this, add more power to that, speed up your computing — everything is modular. My only questions are: why did it take so long; and when will other manufacturers start producing modular machines?

#### High tide, low prices

Computer software publishers are joining the makers of cutrate PC clones in a scramble toward lower prices. The growing number of cheap computers from Taiwan, Korea and Hong Kong is forcing customers to look at software in a new way. If a company spends \$US600 on a machine that duplicates the functions of the \$US2895 IBM PC/XT, would it spend \$US695 on a database or spreadsheet package? Probably not.

Although established market leaders such as Lotus and Ashton-Tate are able to continue selling their wares at a high price point, most others are cutting prices, even on fullfeatured products. For example, Adam Osborne's Paperback Software promotes its VP-Planner as a 'keystroke-forkeystroke' replica of Lotus 1-2-3, with several additional features, all for \$US99.95. compared with 1-2-3's hefty price of \$US495. Another 1-2-3 lookalike, Twin, is marketed by Mosiac Software. Originally priced at \$US149, Mosiac recently cut the price to \$US99, breaking what some observers believe is the psychological sticking point for software customers.

In just 13 months, Dac Software of Dallas, Texas sold 130,000 copies of its \$US69.95 Dac-Easy Accounting, a package that competes primarily against considerably more expensive accounting packages such as one from Chang Laboratories which sells for \$US500.

Even some makers of highpriced packages are jumping on the low-end bandwagon, with stripped-down versions of their breadwinners. For example, WordPerfect, publisher of a \$US495 word processing package, has brought out two low-end entries - Personal WordPerfect (\$US195) and Junior WordPerfect (\$US95) --which, the company claims, reach different markets and don't cannibalise sales. Low price software publishers share one major problem with their high-price cousins: shelf space. Unless a program is already established in the market, few retailers will stock it. Moreover, most salespeople are familiar with only three or four programs of a given type, and almost invariably encourage customers to purchase a higher priced one.

#### Random bits

The MacWorld Expo in Boston was a great success. MicroSoft released Macworks (\$US295). an integrated package not unlike Apple's popular Appleworks for the Apple II family. Uncharacteristically, Apple chairman John Sculley enthusiastically endorsed the package, saying he 'found it much easier to use than Jazz' (the much-touted integrated package from Lotus). Ashton-Tate demonstrated dBase Mac, a \$US495 relational database which reportedly does everything that dBaseIII does on the IBM PC. Layered Inc. announced that it was shipping Insight Accounts Receivable and General Ledger software (\$US595 each), integrated accounting packages for small and medium-sized businesses. A handful of other products mostly upgrades, utilities and fonts - from other manufacturers were also introduced. END

# **New tricks** for old mice

Dick Pountain explains how you can integrate the mouse with your applications by programming it to emulate the keyboard, using the Microsoft mouse as his example.

The mouse is rapidly progressing from | being an avant-garde accessory, redolent of the research lab, to a widely used pointing device for ordinary PC users. If you doubt this, consider the fact that all the new mass-market 68000-based PCs (the Macintosh, Atari ST and Amiga) come with a mouse as standard fitting, as does the new Amstrad PC clone reviewed in this issue. What's more, any owner of an IBM PC or clone can purchase one of a choice of mice.

There has been much debate about the of mice in non-graphic applications with opinions ranging, as is usual in personal computing, from drooling enthusiasm to outright hatred. I fall squarely in the middle of this debate. I've been using the Microsoft mouse for more than two years now on IBM PCs, and as a result have been able to form what I hope is a balanced opinion.

The fact that the Microsoft mouse is an afterthought for the PC, and is not directly supported by the operating system, is not a bad thing. You can program the mouse to emulate the keyboard in more or less sophisticated ways using Microsoft software, which means that you can choose at what level to integrate the mouse with your applications.

My own experience has been that I started out by using large numbers of pull-down menus in an attempt to 'mousify' all the commands of my main applications (which, for a technical writer, means mainly word processors and programming systems). Over time, however, I became more and more irritated by layers of pulldown menus, and found myself stripping away features one by one until I had a set of minimal commands that could be assigned to the mouse buttons alone.

Eventually I doscovered that the only functions I really wanted to use the mouse for were moving through text rapidly (as a substitute for the cursor keys), and selecting blocks of text for moving, cutting and pasting, whatever. For these purposes I find the mouse absolutely indispensable; going back to using the cursor keys would be as traumatic as returning to cassette instead of disk. For all the other commands, function keys are much faster and more convenient than the mouse (assuming, of course, that the application you're using is welldesigned).

After passing through this minimalist phase, I discovered one more thing that I wanted to do with the mouse, namely to draw diagrams. In the sort of technical writing I do, it's frequently necessary to illustrate a point using a simple block diagram. I'm not talking here about great works of art with air-brushed shading, but merely boxes, joined by lines, containing text.

At one time I woud have had to draw such boxes separately using a pen and ruler. Later it became possible to use box graphics characters (such as those on the IBM PC and many other computers), but it was an awkward and timeconsuming business to design them with the cursor keys. What I wanted was the ability to design and draw diagrams straight into my text, using my ordinary word processor, immediately the thought occurred, just as if they were ordinary words. I've achieved this in a modest but effective way using the Microsoft mouse.



#### MAKEMENU

The Microsoft mouse comes in two versions, one of which plugs into a serial port, the other using an interface board which plugs into an expansion slot. In both cases the mouse is coupled to PC-DOS by driver software which has to be loaded when you boot the computer. Under DOS 1 this meant running a program called MOUSE.COM, while under DOS 2 and 3 it requires a DEVICE=MOUSE.SYS statement to be put into the CONFIG.SYS file which loads external device drivers.

In neither case will this make your programs respond to the mouse unless they were designed to use it, and very few are (those are mostly CAD and



drawing programs). All that MOUSE.SYS does is to put in place the software links that enable the mouse position and status to be read via DOS. Actually doing the reading is another matter.

For the minority of people who write their own applications, mouse support can be included by reading the mouse directly. Microsoft supplies a library which can be linked to programs written in the company's C, Pascal, Fortran and compiled Basic, and many other languages like Borland International's Turbo Pascal now support the Microsoft and other mice. You can also read the mouse directly from interpreted Basica, and from assembler programs by using software interrupt 51. The mouse can be programmed in either the text or

graphics mode of the PC. In text mode cursor movement will be in units of one character position, and the cursor will be a normal flashing block. In graphics mode the cursor moves smoothly by single pixels, and you can program fancy cursors (such as arrows, hourglasses, crosses and little hands) as on the Macintosh or in GEM. However, this article is not about programming the mouse at this level (the *Microsoft Mouse Manual* covers it reasonably well).

For the vast majority of people who use packaged applications, there is a relatively easy way to integrate the mouse with software that was not designed to use it. Microsoft supplies with the mouse two programs, called MAKEMENU.EXE and MENU.COM,

which enable you to write programs in a high-level Mouse Menu 'language' that makes the mouse emulate keystrokes typed at the keyboard and provides a very easy way to build pull-down menus. Such programs only work, of course, in text mode; a keystroke on the IBM PC produces a character code, not a graphic object. This is fine since all the most popular PC applications, such as spreadsheets; word processors and databases, run in text mode. The exceptions are drawing programs and programs written to support the GEM or MS-Windows environments, and these should have mouse support already built-in.

MAKEMENU is actually a specialpurpose macro-assembler which

#### PROGRAMMING

accepts a Mouse Menu source program, written as an ordinary text file using a word processor, and turns it into a machine code program. MENU.COM then loads such a program and makes it stay resident, even when an application is loaded on top of it; it sits in the background reading the mouse, and translating its movements and button presses into the required keystrokes. Any application running on top of the mouse program thinks that it is receiving commands from the keyboard.

Since all applications programs are ultimately controlled by keystrokes, you can in principle do everything with the mouse, given sufficient menus. What I want to examine here are the design decisions and performance considerations that are needed to use MAKEMENU effectively. There isn't room, or the need, to describe the Mouse Menu language in full; Microsoft's manual does that well enough. Suffice to say that it has a very simple structure with no provision for looping, the only form of control being a jump to a label. However, some of the keyword commands are extremely powerful — for example, creating a whole pull-down menu, complete with all the cursor movements necessary to make selections from it.

#### Simple movement

The simplest possible mouse program is one to merely make the mouse move the cursor. Even here, though, there is a design decision to make. The first mouse program I wrote was to drive WordStar, and without thinking I chose to make the mouse movements emulate the WordStar cursor movement commands `E,S,D and X. It worked after a fashion, but of course it did not work with any other program which used different control codes, thus forcing me to write a different program for every application I used.

The obvious (in hindsight) choice is to make the mouse emulate the IBM arrow cursor keys themselves. The mouse will then drive the cursor in any program which recognises the arrow keys, which nowadays should mean every sensible program (see Program 1).

In Program 1 I have left out the actions to be performed by the button presses, hence the three empty commas at the start. Anything written after a semicolon is comment and is ignored by MAKEMENU.

The actions to be performed are specified by giving them a name or label. For example, when the mouse is moved to the right, the action 'right' is performed. The action 'right' is defined

```
key
variable1
variable2
variable3

Fig 1 A simple block diagram courtesy of the mouse
```

```
,,,left,right,up,down,4,8
BEGIN
left: TYPE 0,75
right: TYPE 0,77
                                 ; left arrow key
                              ; right arrow key
                                ; up arrow key
          TYPE 0,72
up:
                                 # down arrow key
          TYPE 0.80
down:
BEGIN is the Mouse Menu statement which assigns the initial actions to
the mouse, and every program must begin with one. The full syntax is:
BEGIN <left button>,<right button>,<both buttons>,<left
move<,>right move>,<up move>,<down move>,<horizontal
resolution>, < vertical resolution>
Program 1
```

as being TYPE 0,77, and 0,77 is the extended ASCII code for the right arrow key of the IBM keyboard (many IBM special keys send two characters when pressed). You can look up these codes in appendix G of the Basica manual.

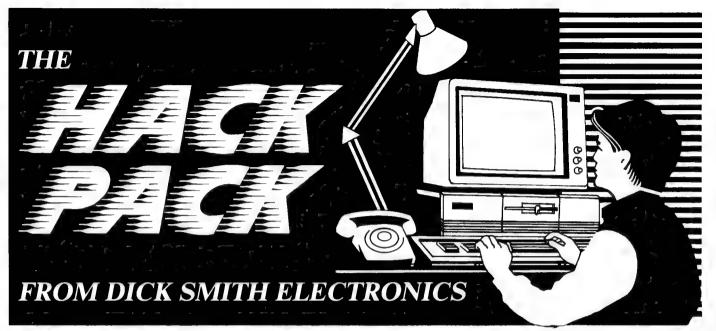
Horizontal and vertical resolution control the 'gearing' of the mouse in each direction; that is, how far the cursor moves for a given mouse movement. Smaller numbers mean higher gearing, hence faster cursor movement. Choosing the right gearing is a matter of personal taste and the performance of your application, and must be found by experiment. The gearing 4,8 in Program

1 is rather fast and is what I use for the PC-Write word processor which is very quick. In contrast WordStar's character input routine is very slow, and a gearing of 16,32 would be more appropriate; otherwise the cursor will lag very far behind the mouse movement, and the PC's input buffer will overflow with a cacophony of beeping.

I find that for text editing it's best to use a faster horizontal than vertical gearing (hence 4,8) as this reduces the tendency of the cursor to flip unwantedly onto the line above or below the one you're moving along.

Many word processors, WordStar

```
bmark, emark, , left, right, up, down, 4,8
BEGIN
        TYPE 0,64
                             : Fo key
bmark:
                             : F5 key
emark:
        TYPE 0,63
       TYPE 0,75
left:
                             a left arrow key
                            a right arrow key
        TYPE 0,77
right:
        TYPE 0,72
                            ; up arrow key
Lp:
                             : down arrow key
        TYPE 0,80
down:
Program 2
```



If you're into hobby computing, DSE has what you need... at the right price! If you're into serious hobby computing, you'll already know that the IBM PC format has become the world-wide "standard" for business personal computers.

And if you're intent on h..k..g, you'll need this standard too.

Dick Smith Electronics has put together a special package for the serious computer hobbyist. You won't buy a better system:



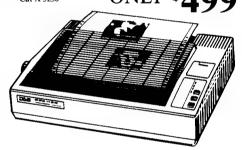
- DSE Multitech PC500: IBM software compatible, 256K memory (expandable to 512K), 360K disk drive, and much more.
- Green Screen Monitor
- DSE 1200 Modem (1200/75 and 300 baud)
- Serial Cable
- 'Mirror Data" communications program
- Plus the following software and manuals: MS-DOS, PC Tutorial, Running MS-DOS, Multitech Technical Manual. Cat X-8016

Normally worth almost \$2400... you save over

#### **Printer**

**DSE130 Dot Matrix** 

You'll need something to keep a hard copy of what you find! ONLY \$499 Cat X-3230



#### Just want a Modem?

DSE has a choice of two:

DSE1200 - 1200/75 and 300 baud, auto answer modem just right for using your computer to ... Cat X-3300

**VALUE \$349** 

DSE300 Dataphone — ideal for bulletin boards and most standard 300 baud half/full duplex communication. Cat X-3301

GREAT



#### **Monitor Swivel** Bases

**Standard Model** — use your monitor at the angle that suits YOU! Adjusts 12.5 degrees in both directions. Non-skid feet and positive locking feet.

ONLY \$2495

Deluxe Model - higher swivelling means even more viewing angles; suitable for those really difficult locations. JUST

#### **Disks**

Quality DSE disks from only \$2.75 each in quantity! Made by a famous disk manufacturer especially for DSE. Double density format.

Single Sided Cat X-3500 Library box of 10 disks

Double Sided Cat X-3501 Library box of 10 disks



NSW • Brookvale 93 0441 • Chullora 642 8922 • Gore Hill 439 5311 • Miranda 525 2722 • Newcastle 61 1896 • North Ryde 88 3855 • Parramatta 689 2188 • Tamworth 66 1711 • Wollongong 28 3800 • York St 267 9111 • ACT • Canberra 80 4944 • Elizabeth St 67 9834 • Richmond 428 1614 • Springvale 547 0522 • QLD • Brisbane City 229 9377 • Buranda 391 6233 • SA • Adelaide 212 1962 • WA

Perth 481 3261
 NT
 Darwin 81 1977
 TAS
 Hobart 31 0800

#### **PROGRAMMING**

included, are less than ideal for mouse control because they don't fill the area beyond the end of a line, or between multiply spaced lines, with space characters. You can tell if yours is one of these by seeing what happens when the cursor is moved one space beyond the end of a screen line. In WordStar it will flip instantly down to the beginning of the next line. This will drive you barmy when you use the mouse; whenever you accidentally 'mouse' too near either margin, the cursor is suddenly teleported to the opposite margin, while moving through a double-spaced document becomes a nightmare of wildly oscillating cursor movements. I solved this problem at a stroke, abandoning WordStar for PC-Write (though there were many additional reasons to do

To actually run Program 1, write it into a plain ASCII file (for example, a WordStar non-document file) called MYMENU.DEF. Then run MAKF-MENU, and when it asks for a filename, tell it MYMENU. MAKEMENU will assemble the program (assuming you have made no typing mistakes) into a new file called MYMENU MNU. The program is installed by typing MENU MYMENU (you will eventually want to put this command into AUTOEXEC.BAT so that the mouse program is installed when you boot up). The mouse will now emulate the pressing of the four arrow keys. Only the .MNU file is executable, and the .DEF file could be deleted (assuming you never want to alter the program). The mouse program can be disabled at any time by typing MENU OFF from the DOS prompt, and reenabled by simply typing MENU.

#### Selection

Program 1 completely ignores button presses, which is rather a waste. The question is — what do we make them do? In my minimalist phase, all I wanted was for them to mark a text block. So in WordStar one could, for example, make the left button perform ^KB and the right button perform ^KK. This is open to the previously raised objection that it becomes meaningless inside other applications. An alternative favoured by some is to make the buttons produce keystrokes that are used a lot, such as ESC and CR.

I chose to make the buttons emulate two of the IBM function keys, because I discovered that all the applications I use regularly are highly user-configurable (perhaps that's why I use them), so I could install them all to use these two function keys in equivalent ways and thus use the same mouse program for

all. I chose F5 and F6 and set these up to perform block marking in PC-Write, Side-Kick's Notepad, the Turbo Pascal editor, PC-Forth and PC-Outline. The revised program is shown in Program 2

This leaves only one control unaccounted for, namely the pressing of both buttons together, and any extra functions will have to be accessed through this.

#### Simple drawing

My first diagram-drawing program was very simple indeed. It didn't use the IBM extended graphics characters, for three reasons. Firstly, at that time I found them very inconvenient to print on my Epson printer. Secondly, there are too many characters (with all the corners and joints) to select from without using a large menu. Thirdly, and the clincher, I need to send my text via a modem using Telecom's PSS service, and 8-bit IBM graphics characters do not travel well (they tend to emerge as ordinary alphabetic characters).

Accordingly I chose to use crude 'dotty' boxes built from the hyphen character '-', the vertical bar character '-', and the plus sign '+' for corners. The result is shown in Fig 2.

In a graphics-based drawing program' like Macpaint, you hold the button down to draw. This doesn't work with a character-based Microsoft mouse program as only the actual button press event can be detected, not the state of being held down or released.

Another attractive design feature would have been to draw boxes merely by pointing to the diagonally opposite corners; for example, top left and bottom right. Unfortunately the Mouse Menu

language has no commands for reading the current screen cursor position, or for looping, and so this avenue is barred.

I found the most effective solution was to make mouse movement itself do the drawing; moving to the left draws a line to the left, and so on, the mouse leaving a trail like a turtle. Obviously you need to be able to switch this trail off to move to another location without drawing, and so I made the right button toggle between drawing and simply moving. The left button merely types a '+' sign to make the corners. In this way I can draw a whole diagram controlled only by the buttons, with no menus required.

Now, of course, there are two different mouse modes. In the normal mode, the mouse moves the cursor and the buttons select blocks of text; in the drawing mode, moving the mouse draws lines. To switch between these modes a small menu is advisable, just to give visual proof that the switch has happened. Switching is achieved by pressing both mouse buttons together, and selecting an option from the menu (see Program 3).

In Program 3 I used the simpler of Microsoft's automatic menu-creating facilities. The structure MENU...MEND creates a pull-down menu called DRAW MODE, with the two options ON and OFF. It appears at screen row 1,, column 67 in reverse video — that is, black on white. (NB Be very careful when using MENU...MEND not to leave any spaces between the option text and the comma which separates it from its action; for example, OPTION 'ON', draw. If you do, MAKEMENU will fail to see the action and the option will have no effect; an undocumented 'feature' which caused me hours of fun).

The actions caused by choosing

```
BEGIN bmark semant switchmode left right up, down, 4,8
                TYPE C. 84
                                                3 F6
      hower lear
                TYPE 0,63
                                                  F5
      enark:
                                                ; go left
      left:
                TYPE 0,75
                                                ; go right
      night.
                TYPE 0,77
                                                 go up
                TY™E 0.72
      sp:
                TYPE U.BO
      down:
                                                ; go dawn
; cheate mode switch menu
                        MENU "DRAW MODE", 1,67, inverse
      www.tahmodes
                           OPTION "GN", draw
OPTION "GFF", restore
                        MEND
                    ASSIGN bmark, amark, switchmode, left, right, up, down, 4,6
      restore:
                    ASSIGN plus, move, switchmode, drawl, drawr, drawd, drawd, 8,12
      draw:
                    ASSIGN plus, draw, switchmode, left, right, up, down, 4,8
      00/20/2009 5
                 TYPE 43,0,75
      plus
                                                ; type f, go ieft
                 TYPE 0,75,45,0,75
TYPE 0,77,45,0,75
TYPE 0,72,124,0,75
                                                g ga left, type - , ga left; ga right, type - , go left
      drawl:
      drawes
                                               ; go up, type | , go lett
; go down type | , go lett
      drawus
                 TYPE 0.80,124,0,75
      drawd:
 Program 3
```



The slot mounted 20 Megabyte hard disk system fits in one slot of a PC. The unique side by side design allows it to be plugged into slot 5 and nestle behind your floppy disk drive(s). (Slot 7 on the PC/XT).

Ability to run a second drive from its controller giving you 40 megabytes of storage.

Software included for diagnostics, formatting, and included is 1DIR, the hard disk organizer, a \$95.00 retail value.

#### BENEFITS:

Ability to run 2 floppies in the PC, OR 1 floppy and an internal back-up unit OR an additional internal drive with the Qubié 20megabyte HardPack.

- Drive Manufacturer: Tandon
- Drive Surface: Chromed
- Drive Size: 3.5"
- Controller Manufacturer: Basic Time (Qubié)
- Controller Size: 5.25"

#### **Recommended retail price:**

\$1599.00

Inclusive of sales tax

#### Available at:

Your local PC dealer NOW!

UNIT 10, 16a HEARNE ST MORTDALE 2223

Telephone (02) 534 6000



#### **PROGRAMMING**

options ON and OFF are defined in the statements 'restore' and 'draw' which use the ASSIGN command. ASSIGN works exactly like BEGIN but inside a program rather than at its beginning; in other words, it reassigns the functions of the mouse.

- 'restore' does exactly the same as BEGIN, setting the mouse back to its original functions.
- 'draw' sets the mouse movements to produce dashed lines. Note that as well as typing the '-' and '| ' characters, some cursor movements are needed to keep the motion consistent. Typing a character normally advances the cursor one place to the right and we have to undo this motion with a 'go left' character.
- 'move' allows you to move without drawing, and is toggled by the right button (because 'draw' calls 'move' and vice versa).

To draw effectively with this program, some conditions need to be met. Your word processor must be set to Overwrite rather than Insert mode, otherwise a nasty tangle results. Similarly, automatic reformatting, if you have it, must be switched off. Finally, you need something to draw on. As pointed out earlier, editors like WordStar do not actually fill a gap in the text with spaces. What looks like a gap on the screen is a 'black hole' consisting only of invisible newline characters at the left margin, and the cursor cannot enter it. With editors of this kind you will need to create a 'canvas' of real space characters (as produced by the spacebar) to draw on. The simplest way to do this is to create a special file which contains, say, 30 lines of spaces, and import this into your document (for example, with ^KR) whenever you want to make a diagram. This is another good reason to prefer editors such as PC-Write which fill with spaces.

## Drawing with graphics characters

Eventually I succumbed to the desire to draw diagrams with IBM graphics characters as well as dashed lines (largely because I found a convenient way to print them). The program for this is rather more complex than the last (see Program 4). Just to draw single boxes you need 11 different characters (horizontal and vertical line segments, four corners and five junctions) and if you wanted the double lines too, the number escalates tremendously. Obviously these cannot all be accommodated on two buttons, and so a menu becomes necessary.

Playing with nasty, long, thin pull-

```
BEGIN bmark, emark, dron, left, right, up, down, 4, 8
               TYPE 0.64
                                         ; as above
bmarks
               TYPE 0,63
emar # $
               TYPE 0,75
lefts
right:
               TYFE 0.77
UDI
downs
               TYPE O.BO
drons
               MENU "DRAW MODE", 1,67, inverse
                 OPTION "DASH", draw
OFTION "BRAPH", grad
               MEND
               MENU "DRAW MODE".1.67.inverse
droffs
                 OPTION "OFF', restore
               MEND
               ASSIGN plus, move, droff, drawl, drawr, drawu, drawn, 8, 12
draw:
               ASSIGN plus, draw, droff, left, right, up, down, 4.8
move:
pl 18:
               TYPE 43,0,75
                                            1 as above
               TYPE 0,75,45,0,75
drawle
drawr:
drawui
drawd:
               TYPE 0,80,124,0,75
               ABSIGN commenu.gmcve.droff.grafl.grafr.grafu.grafd.8.12
orafi
               ASSIGN cornmenu, graf, droff, left, right, up.down, 4,8
3move:
                                            ; go left, type - , go left
; go right, type - , go left
; go up, type I , go left
; go down, type I , go left
grafl:
               TYPE 0,75,196,0,75
               TYPE 0,77,196,0,75
TYPE 0,72,179,0,75
grafes
gratus
               T/PE 0,80,179,0,75
grafds
               ASSIGN Emark, emark, dron, left, right, up, down, 4,8
restores
               POPUP 12.38, inverse
cornmenus
                  TEXT "HH"
                  TEXT " TEXT
                  SELECT 1,1,1,corner1
                  SELECT 1,3,1,corner2
                 SELECT 3,3,1,corner3
SELECT 3,1,1,corner4
                 SELECT 2,3,1,corner5
SELECT 2,1,1,corner6
SELECT 3,0,1,corner7
SELECT 1,2,1,corner8
                  SELECT 2,2,1,corner9
               PEND
corneria
                        218,0,75
                                            ; after typing one of these circler u
                        191,0,75
                                               junction characters, the cursor
corner2:
cornerS:
               TYFE
                        217,0,75
                                              remains in the same place.
               TYPE
                        192,0,75
corner4:
               TYPE
                        180,0,75
corner5:
corner6:
               TYPE
                        195,0,75
carner 71
               TYPE
                        193,0,75
corner8:
                        194,0,75
corner9:
                        197.0.75
Program 4
```

down menus convinced me that they were much too difficult to select from accurately, and I decided the most elegant solution was to fit the nine corner and junction characters together to make a window-pane shaped 'menu':

Any of the nine characters can be chosen from this 'menu' by moving no more than four places. The Mouse Menu language's POPUP...PEND structure creates such multi-column menus very simply. As before, mouse movement draws horizontal and vertical lines, but now the left button summons the window-pane menu to choose the proper corner or junction character.

The DRAW MODE menu now offers a choice of two drawing modes, and a

second menu is summoned from either mode to switch drawing off.

Enormously complex mouse-driven systems can be created with the Mouse Menu language, and if you pay sufficient attention to the ergonomics they can be made easy to use without a mess of menus. My latest creation allows me to 'paint' in four shades of grey tone as well as drawing boxes, but I'll spare you that one for now!

# TULLY COMPU-PRINT

For all your Computer and Office Stationery Requirements

ACTORER	AMII NUVE	MDEN OILE
•	WE ARE DISTRIBUTORS FOR LEADING EDGE COMPUTERS FOR MORE DETAILS AND GREAT PRICES FEEL FREE TO CONTACT US	Colour Ribbons FOR EPSON PRINTERS   S12.50   MX/RX/FX 100   S 9.50   MX/RX/FX 80   LX/GX 80   S 9.50   S 9.50
CARTON 2500	PHONE ORDERS HOT LINE (07) 379 5100 ENQUIRIES (07) 379 5218 REVERSE CHARGES ACCEPTED Open: — 7am-7pm Mon-Sat SEND MAIL ORDERS & CORRESPONDENCE TO: TULLY COMPU-PRINT P.O. Box 20, Graceville, Qld. 4075.	PLEASE SEND ME THE FOLLOWING ITEMS OVERNIGHT BY KWIKASAIR:  \$0 \$0 GUARANTEED OVERNIGHT DELIVERY BY KWIKASAIR:  Enclosed Cheque/Purchase Order/Visa/ Bankcard Mastercard for the balance of:  SIGNATURE:  CARD EXP: MONTH  YEAR  NAME: Mr/Mrs/Miss  ADDRESS:  SUBURB:  STATE:  P/CODE:
For all your Comp		PU-PR///T ationery Requirements
* HIGH IMPACT AND SMOKED PLASTIC LID.  * HIGH IMPACT AND SMOKED PLASTIC LID.  * HOLDS 80 TO 100 51/4" DISKS.  * LOCKABLE AND HINGED LID.  * 15 95	Visit us at the Computer Presidential Room at the Hotel 5th to 8th of Nove  51/4" FLOPPY DI Single sided/double densi	SKS

SUBURB:

P/CODE:

STATE:

# Ready, willing & able

A project funded by some of the leading names in Australian industry is achieving some success in finding computer related employment for disabled people. Kester Cranswick reports.

Disability can seem the end of the employment road for many people. Whether it is an accident that wreaks permanent damage on the body, or a genetic inheritance, present from birth, disabled have often found themselves unemployed and unem-

Fortunately, the computer is able to bring disabled people back into the workforce. There are organisations that can train the disabled, equipping them to perform tasks that are immensely valuable in the office. And, what is even better, many employers are finding that disabled people are better at certain types of jobs than physically healthy people.

Evidence to support this view comes from research into the subject of autism, and how computers are able to help

overcome this handicap.

Autism is a severe mental handicap in which children become extremely selfpreoccupied. They are unable to communicate in a normal manner with other human beings.

What researchers, such as Dr Roger Coldwell of the Royal Melbourne Institute of Technology, are discovering,

is that autistic children respond very well to computers. It seems they can relate to a machine because they know they are in total control of it.

Coldwell cites examples. One nine year old girl, after two sessions at a computer, grabbed the mouse from her mother and proceeded to show her how to use the graphics system. In the next session, she occupied the centre seat, and took over from her mother. In another case, a 12 year old boy, unable to concentrate for longer than 35 minutes, had to be dragged away from the computer after two and a half hours at the keyboard.

From his research Coldwell concludes that autistic people would make very good keyboard operators. "An autistic person would work on oblivious to distractions. They wouldn't feel lonely working at a terminal on their own either," he says. Their ability to relate to a computer is a positive asset.

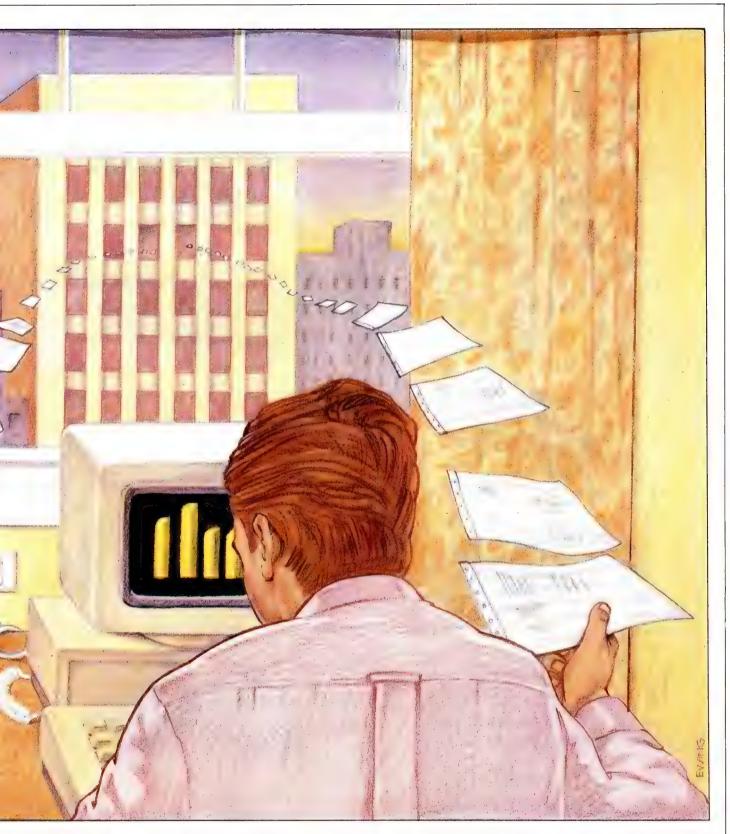
Autism is something people are born with. Disability can strike at the prime of life too.

Take the case of Kevin Cosgriff. He had been working for ICL as a bureau programmer and in customer support since 1966. Then, in 1980, he was just



completing a marathon 500km flight in a glider when he hit a violent front, and the glider plunged into the ground. "I don't remember anything other than that something grabbed the glider," he

Cosgriff was in hospital for four months, and his injuries left him in a



wheelchair, paralysed from the waist down. He spent a further eight months undergoing rehabilitation and learning to adjust to his disability.

Now he is back at ICL, working as a special projects manager. The new ICL building in Queens Rd, Melbourne, has ramps instead of stairs, so he can get

around the place and he parks his car on the site of the building. He plays a vital role in the organisation. "There was no appreciable effect on my work other than the time off" he says

the time off," he says.

Cosgriff is lucky. His job can be done at his desk, and he has the technical knowledge to carry it out. His disability

has not prevented him carrying out his work.

But what about all the disabled people who don't know an Esc from an Alt key?

There is an Australian organisation that specialises in teaching them new skills. It is called Nadow, but was once

# PERSPECTIVE

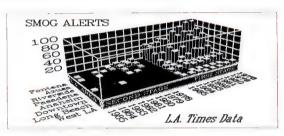
#### INCREDIBLE 2 AND 3 DIMENSIONAL DATA GRAPHICS FOR YOUR PC

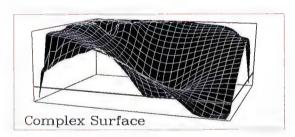
GRAPH MORE DATA POINTS than is possible with two dimensional graphs. A three dimensional graph can give instant understanding to hundreds, thousands, of data points.

IMPORT/EXPORT DATA between LOTUS 1-2-3, MULTIPLAN, and many other popular spreadsheet systems, word processors and editors.

SELECT FROM 15 PRESET 2-D GRAPH TYPES, in-

cluding: horizontal and vertical bars; stacked bars; percentage bar; polar phase chart; multiple lines; area, transparent area; pies, multiple pies, exploded pie and shading.





SELECT FROM up to 180 different shades and patterns for graph surfaces, backgrounds, base and walls.

OVER 30 SCREENS OF CONTEXT SENSITIVE HELP. Simplified 5-key pictorial user interface.

without leaving Perspective.

on most popular dot-matrix and laser printers, including Hewlett Packard and Cordata.



MegaVision House 255-259 Pacific Highway, North Sydney, N.S.W. 2060 Telephone. (02) 957 5797 Telex, AA123436 MEGVIS Fax: (02) 925 0069 P.O. Box 1076, North Sydney MANG AND Securities Analysis

Block Trade

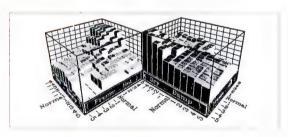


SELECT FROM 32 PRESET 3-D GRAPH TYPES, including various riser shapes, columns, row ribbons, walls, connected tops, "floating" tops, and many others.

CHOOSE FROM 16 DIFFERENT PRESET 3-D VIEWING ANGLES.

FURTHER MODIFY 3-D VIEWING ANGLE through real-time graph frame rotation on the screen. Continuous rotation on screen or graph axes; also zoom, pan, stretch, and increase or decrease the perspective distortion.

**OPERATOR CONTROL** of all graphing parameters.





© 1986, Three D Graphics Printed in U.S.A. Specifications subject to change without notice

#### **EMPLOYMENT**

known as the National Association for Training the Disabled in Office Work, and is based in Sydney. Nadow is backed by many of the leading names in Australian industry.

Nadow has a philosophy, and it has remained unchanged since 1965. Adrian Bradley, Nadow's training officer sums it up by saying the goal is "to make people marketable in the current labour force."

In Australia, as in most other Western countries, there is a chronic shortage of people skilled in the use of computers. It is one of the few job areas where employers cannot discriminate, so acute is the staff shortage.

Even so, there is a credibility problem, and Nadow has worked hard to give the disabled credibility in the eyes of employers. To that end, it has the backing of such companies as IBM, Hewlett-Packard and ICL, in the computer field, and AMP. Waterhouse, Rank Xerox, James Hardie, Amatil, BHP. Caltex. Castlemaine Tooheys, George Weston and the State Building Society. All these organisations have provided monetary assistance to Nadow, and taken in Nadow-trained people.

According to Bradley, it works like this. "We rely on these companies to create a vacancy where trainees can work and gain recognition of their aptitude, skill and motivation. If, at the end of the training they get a work reference, signed by the company DP manager, there's your credibility. You can have a reference from God and employers will question it. DP managers tend only to believe other DP managers."

Bradley is not one for the soft approach. "We hit the employer behind the desk with the fact that if they're going to be prejudiced, they're going to feel bloody guilty about it. If the person can do the job, they should be given the opportunity.

"We're not talking about affirmative action, we're not talking about quotas, we're not even talking about sympathy. We're only talking about a fair go," he says.

The term disabled covers a wide range of injuries. It can range from a back injury to epilepsy to partial or complete blindness, as well as embracing the more widely recognised disabilities such as loss of limbs or damage to the central nervous system, resulting in quadriplegia or paraplegia.

If you listen to Bradley, you'll soon discover that disability is no small problem. Back injuries are far and away the most common. He says that one in six men who are working in semi-industrial settings will have a minor or

major back injury by the time they are 40.

Bradley differentiates between disabled people who have had their disability all their lives, and those who were struck down when they were adults.

"Disabled people in the former group have often adjusted to or accepted their limitations, though they have differentially socialised," he says, meaning that their social contacts are in the world of the disabled, or within the family and close friends.

"The other group has a completely different set of issues. We don't have to teach them the idea that you have to work to look after yourself. They know that. What they're trying to do is adjust to their disability."

He is not of the opinion that a disability makes someone unemployable. "An injured back, or disability, doesn't make any difference to their mental capabilities," he says.

"You have to remember that only one in seven has a visible disability that seriously impairs employability. Someone with a knee problem, someone who's a controlled epileptic, someone with a vision or hearing problem — none of these disabilities can be seen and there's no wheelchair involved. They are, nonetheless, disabilities."

To be eligible for a place in Nadow, the qualifications are simple: you have to be unemployed, medically able to work in an office or clerical environment and have average intelligence.

Some 80 people start a Nadow training course each year. "The people we get here are motivated. As I tell them, there are only three things they need to be accepted in this program. They are motivation, motivation and motivation. It's hard enough to get a job these days, let alone if you've got a disability and have to completely change job direction," says Bradley.

"If they haven't got motivation, I tell them to go home, watch the midday movie, get on the dole or pension and take the easy avenue. Only five per cent who walk in the door walk right out again."

Those who are accepted into a Nadow scheme get one of two types of scholarship. A computer scholarship, valued at \$7,500, means 12 months of comprehensive training on computers, both at Nadow and on the job. A general clerical scholarship, which runs for just six months, covers modern office and clerical procedures.

On the clerical course, students are trained on two IBM PCs, an Apple IIe and a Hewlett-Packard Touchscreen 150. Sydney Smith, Nadow's computer

## Our Software turns 's into Accountants

**Easily:** Introducing New high powered accounting software for your Apple IIE computer.

## Business Works

By Manzanita Software Systems

provides these extraordinary benefits:\*Simple to learn, set up and use.

- \*Produces a wide range of reports to keep you informed about inventory levels, amounts owing, receivables, cash flow needs.
- \*Totally flexible to grow with your needs.
- \*Modular or fully integrated.
- \*No special training required.
  \*Compatible with "Apple works".
- \*"Help" messages at every point if needed.
  \*Support by **B.H.S.I.W.A.R.E.** when you

\*Support by **B.U.S.I.W.A.R.E.** when you need it.

Accounts receivable, accounts payable, inventory, general ledger (plus system manager). At a low cost of \$476 per module (R.R.P.) Inc. Tax.

Runs on Apple IIE with 1 x 3.5 inch uni-disk or 2 x 3.5 inch uni-disk or uni-disk plus compatible hard disk.

Ask your Apple dealer to demonstrate or for further information contact:



Suite 33, 8-24 Kippax Street, Surry Hills NSW 2010

Telephone

Sydney: (02) 211 1266 Brisbane: (04) 341 5088 Melbourne: (03) 553 0016

WGS BW2736





# Take a Look Inside

NEC's new APC-IV provides complete compatibility with IBM's PC/AT but packs a lot more inside.

#### **Looking for Performance?**

With a clock rate of 8MHz and no wait state architecture, the APC-IV runs rings around other computers.

The APC-IV is 40% faster than the IBM PC/AT.

#### Look closely at the screen — CAD users take note

You'll see either 640x350 pixels (EGA standard) or, with the optional Power Graphics Display, a staggering 1120x750 pixels. No other personal computer even comes close. The industry standard AUTOCAD software is currently being rewritten to take advantage of the APC-IV's resolution.

#### When you're looking for more storage . . .

The APC-IV comes standard with 40MB hard disk storage, upgradeable to 80MB. And RAM to 10MB.

#### **Looking for better value?**

Standard fittings include I/O facilities for parallel and two serial ports, clock/calendar with battery backup, 8 expansion slots and five internal peripheral slots.



#### **Looking for Networking?**

APC-IV has the ability to combine APC-IIIs and IVs, using the APC-IV as a file server with total storage of 80MB. NEC's Netware links up to 16 personal computers via single twisted pair cable up to 1,000 feet in length.

Now you've had a look, look us up:

## **Bayside Computer Systems**

Suite 1, Cnr. Skye Road and Farrell St., Frankston. Ph: (03) 781 4011

4th Floor, 418 St. Kilda Road Melbourne. Ph: (03) 267 6066

#### **Natwick Management**

Suite 2, 25 Burns Bay Road, Lane Cove, 2066 Ph: (02) 428 1666

#### **EMPLOYMENT**

training manager, says that students are not trained to use any particular software packages.

"The micros are used to simulate VDU experience. They call up established files, check data, make entries and so on. There is no point in training on particular packages, as the student may not be using that software when he or she joins the workforce," he said.

Computing students are trained in Cobol. They start with an introduction to the raw concepts behind computing, software and hardware. Then, using two IBM terminals on-line to an IBM 3081 mainframe at Caltex, they are given a course in Cobol. It involves writing 11 programs.

The real training starts on the job. Nadow students are given six months on the job training in the DP industry. Clerical students get three months on the job training. "On the job training gives students confidence, competence and credibility,' says Smith.

Nadow has set up a group to monitor what the labour market needs. Called the Nadow Computer Training Committee, it enables associate companies contribute advice, in addition to their time and money. This means that Nadow trainees are kept as up to date as possible with current trends in the computer industry.

The first software company to join with Nadow was Computations, David Computations' Halliday, marketing manager, is convinced other companies need to get involved.

"My gut feeling is that the industry is probably largely unaware of Nadow's existence. It is probably no more aware of Nadow than the average man on the street.

Companies are now supporting the growing trend in hiring disabled people, but, unfortunately, it's not growing at the rate it should," said Halliday.

There are 16 companies currently associated with Nadow, and room for four more. Nadow is limiting the number of associate companies so that the size of the NCTC does not get out of hand, and so that trainees can be more easily monitored.

Bradley is optimistic about the future. Things will get better. More and more disabled people will be trained and placed in jobs where they can move from being a tax dependent to being a taxpayer. Recognition of potential in disability is happening.'

However, there is still a way to go before chronically disabled people, who are confined to home, can be accepted into the workforce. In the UK, there is a scheme that trains home workers to use a personal computer, and finds them

positions in the workforce. It is being funded by the Department of Trade and Industry to the tune of £500,000, and is run by a London company called IT World. It has already placed 65 disabled people in jobs.

Smith doesn't believe the Australian employment market is ready for this yet. Still, the time may come when any disabled person able to use a keyboard can find work. There is certainly a demand for skilled operators, and the computer offers the disabled a chance to get back into the workforce as productive, enthusiastic individuals. END

#### dBASE **PROGRAMMING**

WE WRITE SOFTWARE FOR ALL TYPES OF BUSINESSES. INEXPENSIVE PC COMPATIBLE HARD-WARE AVAILABLE.

#### Proware P/L DAVID YOUNGER

(02) 371 9524

#### MICRO-EDUCATIONAL P/L

8/235 Darby St NEWCASTLE 2300 Australia's largest computer mail-order company.

OUR LATEST LIBRARY DISK FOR YOUR APPLE, IBM, or MACINTOSH (Add \$10 for Mac 3.5" disks)

These disks contain the best in public domain software. Send 6 x 36c stamps for post.

#### Ask for your FREE CATALOG

Dear George

Please rush me a free library disk for my IBM/ APPLE/ MACINTOSH (Add \$10 for Mac disks) Enclosed Please find 6 x 36c stamps.

NAME:-

ADDRESS:

P/CODE:

#### **MacOneWrite**

#### SO FAMILIAR - YOU'LL THINK YOU'VE USED IT BEFORE!

	Month:	January		Bank	Belance:		4,019	85
	DATE	TO THE ORDER	R OF	DESCRIPT	ION	CHECK	AMOUR	ď
)	5/8/85	City Electric Co	apany	Electric Bill		3	320	DC
	5/8/85	Hountoun Rel I		Talachone			99	ß.
1	5/8/85	Stan s Tire Shop		Auto repairs		5	430	OC
	Contractition	3100 Pearl Stree	t	s. et. attenda. edil.	Stantonistica.	· · · · · · · · · · · · · · · · · · ·		
	, ,	Boulder, Colo 8						
	ay Four	tundred Thirty and 00/	100 dollars					
P								
2	500 · M	annyagegyr-dista	edforus 4	e a think the filling begin	Sierra	Un-Lin	e Inc	
84	nk of Yose	annyanyan diaka nite	1230-3232		Sierra	Un-Lin	e Inc	
84	nk of Yose	nite	1230-3232		-1-01-			
84	nk of Yose Accoun	nite	1230-3232	Account	-1-01-		e Inc	00

You probably already know or use a one-write, pegboard book-keeping system like Kalamazoo, It's one of the most popular systems on the market. It's organised, dependable and easy to use.

MacOneWrite enhances the familiar features of one-write accounting with the power graphics and simplicity of the Apple Macintosh computer. You can use people skills you already have in your business to obtain the benefits of computerized accounting.

MacOneWrite is available in the following modules: Cash Disbursements, Accounts Receivable, General Ledger, from as little as \$355 (R.R.P.) inc. tax per module. Ask your Macintosh Dealer for a demonstration or contact:



33/8-24 KIPPAX ST SURRY HILLS 2010

FOR FURTHER INFORMATION, CALL:

SYDNEY

(02) 211 1266

MELBOURNE (03) 553 0016

BRISBANE

(07) 341 5088

### FREE SOFTWARE

#### SPECIAL SELECTIONS FROM THE PUBLIC DOMAIN (02) 29 2866

	/84	-80
UP	/ IVI	-00

#### DISK No.

- CP1 GAMES. Menu-driven, compiled games, including an excellent one that prints bio-rhythm charts, a clever horse race, and a space trader programme for the wheelers and dealers.
- CP2 GAME. A 191k version of adventure, the classic game which can absorb your attention for days at a time. This is a 550pt version with an expanded cave and smarter creatures.
- CP3 GAMES. More fascinating games to absorb time you can't spare - such as a six level chess game, Othello, a well-written multi-level version of Pacman and an extensive Wumpus adventure game.
- CP8 GAME BOTTICELLI. An extensive word-guessing game in which you think of a person's name and the computer tries to guess it. You can add names to the list. Compiled in Turbo Pascal, with source code provided.
- CP9 TURBO PASCAL GAMES. Includes CH, a game similar to go-moko. Try to place markers before the computer prints a pattern. DICE for those with a gambling streak, one of the best LUNAR LANDER games around, a word guessing game which tells you how many characters were correct and in right position, plus a typing copy game to match words on screen.
- CP21 UTILITIES. A whole heap of useful programmes to catalogue your files, arrange the directory display, make emergency alterations to the disc, allow printing and computing at same time, count words, print the screen, copy better, erase, unerase, delete, make batch commands, etc
- CP28 UTILITIES. A super collection of some of the best utilities available, such as NEWSWEEP, NULU (file library), SUPERZAP and VDO (edit).
- CP31 PERSONAL MANAGEMENT. HANDY is an integrated collection of utilities for keeping track of appointments, planning, listing tasks, goals and reminders, planning action, notebook, phonelist, and making decisions.
- CP32 DISK DOCTOR UTILITIES. Contains two major disc edit programmes written in Turbo Pascal Compiled for immediate use Source code provided. Probe will view and edit sectors, find bad sectors, copy blocks to a new location, and search for text strings. Works on hard disks, ram disks and floppies. Rescue lets you search memory for text that you've written and lost when the computer crashed.
- CP42 TYPING TUTOR. An easy to use, menu-driven programme
- CP43 TEXT EDITOR. This is Express V1.01, a full-screen text editor which also allows macros to reduce tedious operations to a single stroke. Formatting facilities on the disk will do page numbering, centering, justification, superscripts, subscripts, special fonts, and more.
- CP63 GRAPHICS DRAWING. Allows you to edit, rotate, merge, etc. any image you draw on the screen. Is compiled and set up for 1984 Kaypros but the Turbo Pascal source code is provided if you wish to adapt it.
- CP84 TURBO PASCAL UTILITIES. Enhance your programming with listing, sorting, printing, auto-menu and mathematical functions etc.
- CP85 TURBO PASCAL SCREEN GENERATOR. Simplifies development of screens for menus, data, forms, etc. Concentrate on presentation rather than programming.
- CP101 COMMUNICATIONS. TURBO PASCAL BULLETIN BOARD. A complete bulletin board package that has been highly praised by others.
- CP102 COMMUNICATIONS. MDM730. A popular and widely used system. Easily adapted to different machines. Source code and extensive documentation is included. An Apple/CPM version is also available.
- CP141+ DBASEII APPLICATIONS. A powerful collection of 5 discs with fully developed applications packages, programme extensions and algorithms. Includes super mail-management, inventory control, phone tracking, budgetting, graph-making facilities, patches, checking for duplicate entries, menu creation, and many more. \$50 the set instead of \$75.
- CP203 EDUCATION FOREIGN VOCABULARY BUILDER. Teaches a foreign language vocabulary. Can be used to build lessons in various languages. Simple lessons in french are included. Compiled in Turbo Pascal, with source code provided.
- CP501+ MICROBEE SELECTION. A set of three discs of utilities and games that have been tested on the Microbee. Dozens of games, including Adventure. many with source code. \$30 for 3 discs instead of \$45

#### **MACINTOSH**

#### Each MacIntosh Disk is \$20.

#### DISK No.

- ZMC1 GAMES. A splendid collection which includes Mounds, Starburst, Delek, Nerd, Mastermind and more.
- ZMC2 CONCENTRATION GAMES. Othello, Amazing, Music, Mars. Mouse, Orbit, Mouseball, Missile Command.
- **ZMC21** UTILITIES UNPROTECTED/BACKUP. Programmes that allow you to make backups of popular protected programmes.
- ZMC22 FILE UTILITIES. Includes Rude (an editor), Binhex, Make Write, ASCII file printer, Manipulator, Printer, Splitter, List, MacCopy etc.
- **ZMC23** UTILITIES DESKTOP ACCESSORIES. Including Save Screen, Paint Grabber, Eject, Fatscreen.
- **ZMC24** UTILITIES MORE DESKTOP ACCESSORIES. Such as memory, SCI Calc, Term Em, Rubic Cube.
- ZMC25 UTILITIES FURTHER DESKTOP ACCESSORIES. Mag Glass, Clock, Decision Maker, Dice Roller, Calculator, Bugs Calendar, Fkey, Mockwrite, Mockprint, Mockterminal, Phone Book, Conference, Reset, Hexcalc, etc
- ZMC42 SPELLING CHECKER. Discovers spelling mistakes, oversights
- ZMC61 GRAPHICS. Macpaintings, including Migrette, Spades, Castle, Dreams, Eye, Garage, Horse, Keyboard, Set Design, Sputnik, Dinosaur See how it works
- **ZMC62** NAUGHTY GRAPHICS. Girlie-type programmes for those who don't blush easily
- ZMC63 GRAPHICS ICON LIBRARY. A resource editor with 270 lcons to improve your illustrations
- **ZMC64 GRAPHICS 33 NEW FONTS**. A bigger library gives you more power, more control, better presentation
- ZMC65 GRAPHICS VIDEOWORKS DEMO. Seven movies to watch and edit
- ZMC66 GRAPHICS MACPAINT UTILITIES. Includes slide show, Viewpoint, Patterns
- ZMC81+ PROGRAMMING LANGUAGE MODULA 2. A three disk set of this excellent language. Powerful, easy to use, similar to Pascal and a versatile language that is as suitable for beginners as it is for advanced programmes. Two disks for \$40.
- ZMC82 LANGUAGE FORTH DISK. A language that produces very tight coding and gives the author a lot of control in applications. Includes Forthcopy, SoundLab, Toolbox.
- ZMC83 LANGUAGE PRESENTATION. Writing programmes is only half the battle. They still have to interface with the user. Here are twelve Start-Up screens to help you improve ease-of-use and presentation.
- ZMC84 LANGUAGE MBASIC UTILITIES. Picture, Calendar, Disassembler, Clock, Art, Calculator, Compare, File Printer, Pattern Editor, Set Pointer, Font Display, Sounds, CRStripper, Fancy List, REM Remover, Dvorak Keyboard, MacCopy.
- ZMC101 COMMUNICATIONS. A brilliant set with Terminal Emulator MACTEP and the outstanding modern programme Red Ryder v. 6.0E.
- ZMC121 BUSINESS PROGRAMMES. Multiplan Templates and Home, Business Forecasters, Payroll, Cheque Book, Car Records, etc.
- **ZMC122 BUSINESS PROGRAMMES.** More Multiplan Templates, and programmes for investors, such as Stock, Options, Bonds. Includes Time Cards, also.
- ZMC201 EDUCATION MATHS AND GRADING. Let your computer do the work Computers also have endless patience and will let you make errors without an angry outburst. So far
- ZMC202 EDUCATION MUSIC. Contains Music works, including 30 songs. If you'd like to compose on the Mac, here are some good illustrations.

## FREE SOFTWARE

#### SPECIAL SELECTIONS FROM THE PUBLIC DOMAIN (02) 29 2866

Well, almost free. We don't charge for the public domain software but there is a small service charge of \$15 per disk to cover promotion costs, selection, testing, copying, etc. Disks are available for CP/M, MS-DOS and APPLE. Mail and telephone order only.

The programmes have been carefully selected, tested and documented. They'll run on a wide variety of computers that accept 51/4" disks. We have tried to choose programmes as machine-independent as possible. However we cannot guarantee the suitability of programmes for your particular machine. Wherever possible we include source-code.

MS-DOS programmes are aimed at the IBM-PC and close compatibles. The NEC APC III will often require the software library extension card to be able to execute these programmes. Documentation is included on the disks where required — often it is very extensive. Unfortunately, we are unable to provide telephone tutorials on using the programmes.

MS-DOS disks are formatted for standard MS-DOS 2.11 360K. Testing has been carried out for CP/M disks on a Z80 Kaypro II. About 120 different formats are supported, including Kaypro, Osborne, Tandy, Microbee, Bondwell, Commodore 128, Televideo and Apple II.

#### MS/DOS

#### DISK No.

- SUPER COMPILED GAMES. Eight arcade games for those with colour graphics adaptor. Very absorbing. Includes Pango, M5 Gold, Pyramid, 3-Demon, etc.
- SELECTED FAMILY FUN GAMES. A flight simulator, music **M8** generator, excellent Pacgirl, space wars, etc
- UTILITIES. These are essential and include file maintenance M21 superstars like SWEEP and WASH as well as library and squeeze/ unsqueeze programmes. Lots of them
- UTILITIES. Make life easier for yourself with programmes like Util, Z, Vtype, ST, Protect, Unprotect.
- M25 SELECTED UTILITIES. Dozens of highly useful utilities, with documentation, compiled and ready to go. Includes Autodex (super file manager), Membrain (ramdisk) Squeeze and Unsqueeze, Directory Printer, Calendar, File Finder (great for hard-disk), Keyboard Definer, etc.
- UTILITIES FOR PERSONAL MANAGEMENT. Similar to side-M26 kick, these are background utilities that provide calculator, notepad/editor, phone index, alarm clock, calendar, printer controls, typewriter-simulator, window access to directory, display/remove/copy/rename files, etc.
- M27 UNPROTECTION METHODS. Hints and programmes that help you to back-up a variety of copy-protected programmes New 3 disk set for \$30 instead of \$45.
- DISK LIBRARIAN. A collection of some of the best pro-M29 grammes available for cataloguing your disks and keeping track of files. Provides an alphabetical master list, etc.
- M32 **DISK DOCTOR COLLECTION.** Some of the best debugging and file repair programmes around. Includes Jaz, Easy-Zap, Diskit, etc. Ok for hard disks too.
- **WORD PROCESSOR.** Considered at least as good as the commercial programmes. Contains PC-Write, latest version 2.6 plus extensive manuals. For editing and formatting. M41
- MULTI-FRONT WRITER. An incredible word-processing M43 package that prints out scientific notation, Greek letters, gothic, italics, etc. Recommended.
- M48 **OUTLINER FOR WORD PROCESSING.** Considered by many to be the best outliner/ideas processor available. Is fast, can be memory resident, has windows, excellent printing features, etc.
- GRAPHICS. A selection of some of the best programmes in the M61 public domain, including an extensive picture-graphics set of commercial standard.
- LANGUAGE PASCAL. One of the most popular languages M85 for general programming. Well-documented. A very good choice for learning to programme.
- SCREEN DESIGNER. An easy to use interactive screen de-M87 signer to assist you with your programmes. Suits Basic programming.
- TURBO PASCAL LIBRARY SET 1. Special set of routines, aids and utilities for programming in Turbo Pascal. 7 Disks for \$70 instead of \$105

- TURBO PASCAL LIBRARY SET 2. Special set of routines, aids and utilities from Turbo User Group for programming in Turbo Pascal, 6 Disks for \$60 instead of \$90.
- C LANGUAGE LIBRARY. Special set of routines, aids and utilities for programming in C. 6 disks for \$60 instead of \$90. M93+
- M101 COMMUNICATIONS, MODEMS. Two major communication programmes — qmodem and kermit. Lots of bells and whistles.
- GENERAL LEDGER ACCOUNTING. A small-business record-M121 ing system. Highly regarded. Excellent reports.
- M124 STOCK MARKET ANALYSIS. Special aids to help you "think and grow rich". For managing and evaluating portfolios and prospects
- PROJECT/TIME MANAGEMENT. Improving organisation and M125 goal accomplishment. Arranges information, prompts for
- STATISTICAL ANALYSIS: EPISTAT V3. More than two dozen M126 related basic programmes for xanalysis-including Chi square, linear regression, Fisher, Binomial, Analysis of Variance, Histogram, Poisson, Correlation, etc.
- INTEGRATED SPREADSHEET. A two disk set of a comprehensive spreadsheet programme. Has Basic and compiled versions with documentation. \$30 for 2 disks. Includes integrated word processor/spreadsheet/database/graphics.
- **1-2-3 UTILITIES.** Highly regarded collection of utilities that enhance the operations of Lotus 1-2-3. M129
- M132+ 1-2-3 WORKSHEETS. Comprehensive special set of worksheet, aids and utilities for lotus 1-2-3. \$80 for 8 disks instead of \$120 (Does not include M129).
- DBASE 11/111 APPLICATIONS. Extensive group of Dbase applications, programme extensions and algorithms. Includes cheque programmes, mail management, inventory control, budgetting and accounting, memo maker, phone index, menu drive, typewriter simulation, depreciation, automatic format-ting, search for duplicate entries, Spanish lessons, runtime decorder, graphics and other utilities. Set of 5 for \$50 instead of
- FAMILY TREE/GENEALOGY. Extensive programmes in basic for recording, tracing, grouping, printing, etc., family relation-
- DBASE 111 SCREEN/CODE GENERATOR. Greatly reduces the amount of programming you need to do. Much of the coding is generated to include in your own programme.
- FORMS AND REPORTS. A forms generator for displaying information contained in data bases. Compatible with PC-File M149
- M150+ SUPER NEW DATA BASE MANAGER. File Express suits sales/stocks/mailing/personnel/payroll. Will calculate, print invoices, labels, etc Compatible with PC-File. Two disk set \$30. Very good documentation.
- EDUCATION, BASIC TUTORIAL. How to programme in Basic. Onscreen demonstration and explanation.

#### APPLE II, CPM, MACINTOSH COMMODORE 64 Call or write for free catalogue.

#### PUBLIC DOMAIN NEWSLETTER

For news, reviews, views and how to use public domain software subscribe to our bi-monthly newsletter and keep informed on the free programmes that help your computer to serve you. Only \$15 per annum. Includes updates to catalogue.

ORDERS: Each disk costs \$15 (Mackintosh \$20). Add 20% Sales Tax to cost for disks plus \$3 postage and packaging to your total order. Orders must be prepaid.

\*The Public Domain Newsletter costs \$15 per annum and is issued

bi-monthly.
PAYMENT BY MAIL TO:

Box C343 Clarence St, PO, Sydney NSW 2000.

**TELEPHONE ORDERS:** 

Pay by Bankcard, Mastercard or Visa. (02) 29 2866, (02) 29 3810. 3 Barrack St., Sydney. NSW.

PLEASE INDICATE THE DISK FORMAT REQUIRED WITH AN ALTERNATIVE FORMAT IF POSSIBLE.

#### SELECT SOFTWARE

Mail And Telephone Order Only.

We cannot guarantee the suitability of public domain/usersupported software for users' needs or equipment.

## FREE SOFTWARE

#### SPECIAL SELECTIONS FROM THE PUBLIC DOMAIN (02) 29 2866

#### **COMMODORE 64**

#### DISK No.

- D1+ EDUCATIONAL. Over 30 fun and educational games, including logic, word guessing and maths games. 3 disks for \$30 instead of \$45.
- **D2 BEST GAMES.** Includes Adventure, Whirlybird, Chipsury and Monopoly.
- D3 CHESS. Play against the computer or against a friend.
- TRIVIA GAME. Engrossing for those with an interest in planes and aviation generally
- **MUSIC.** Contains many songs, including "Yesterday". See also D201 Music Master.
- D6 PERSONALITY TEST. A computerised version of the Luscher Colour Test.
- D7 SELECTED GAMES (1). Star Trek and Star Wars
- D8 SELECTED GAMES (2). Adventure Games Wizards Castle and Trip to Atlantis.
- D9 SELECTED GAMES (3). Kentucky Derby and Flight Simulator
- **D10 SELECTED GAMES (4).** Mastermind a masterword game.
- D21 BEST UTILITIES (1). Includes Rename, Disk Doctor, Fast Copy, Supermon, Checkbook, Dun 5.0
- D22+ BEST UTILITIES (2). A 2 disk set of popular and highly useful utilities. Well documented. \$30
- **D41 TEXT EDITOR.** A useful programme that will take care of most of your word processing needs
- D42 PRETTY PRINTING. Utilities that will format the output of I sted
- programmes to your printer

  D81 COMPUTER LIBRARY. 13 programmes that include animation, drawing graphs and sorting lists
- D101 BEST COMMUNICATIONS. Modem programmes that enable you to communicate with bulletin boards. Includes 64 Exchange and Term 64
- D121 BUSINESS PROGRAMMES. 14 programmes that range from calculating interest to simulating business and stock trans-
- D201 EDUCATION. MUSIC MASTER tutorial in music
- **D202 BEST EDUCATION.** A selection which includes typing, maths, read & spell
- **D203+ COMPUTER TUTORIALS.** A set of 2 disks comprising Ponzo tutor 1-7, covering Basic 64 and machine language. \$30.
- **D204+ SPEED READING.** A 2 disk set for those who would like to read more efficiently. Includes programme and tutorial. \$30
- D205 FRENCH. Aids and quiz in French language.
- D206+ ENGLISH. About 90 programmes, including word games, parts of speech, poetry, definitions, vocabulary, drills, homonyms, verb forms, punctuation, rhyme, spelling, Shakespeare, word meaning, etc. 7 disks for \$70 instead of \$105.
- D207+ MATHEMATICS. Over 100 programmes for upper primary and secondary including arithmetic, algebra, lots of maths games, metric conversion, factoring, probability, prime numbers, roots, trigonometry, slopes, etc. 8 disk set for \$80 instead of \$120.
- **D208+ SCIENCE.** Dozens of quizzes in physics, chemistry and biology. 4 disks for \$40 instead of \$60.

#### SELECT SOFTWARE

#### Mail And Telephone Order Only.

We cannot guarantee the suitability of public domain/user-supported software for users' needs or equipment

#### APPLE II

#### DISK No.

- A1 GAME. Trivia quiz game. Extensive with built-in editor for adding, changing, deleting questions.
- A2 SELECTED GAMES. Has some beaut games, including a collection of pinball games called Flip It, Maxx's Madness, Super Blast, The Maxx Machine and more.
- A3 ADVENTURE GAME EAMON. The Beginners Cave. First in the series meet the monsters. This disk is essential for playing other games in the Eamon series.
- A4 ADVENTURE GAME, Minotaur's Lair. A3 is also required.
- A5 ADVENTURE GAME. Death Star. A3 is also required.
- AS ADVENTURE GAME. Devil's Tomb. A3 is also required
- A7 ADVENTURE GAME. The Clone Master. A3 is also required.

  Cost for adventure series (A3-A7) is \$15 per disk or \$50 for the five disks instead of \$75.
- A10+ CREATE ADVENTURES. Create your own dungeons and dragons adventure games with this 4 disk set of programmes. Compatible with Eamon series above. Creative and entertaining. Also suitable as an educational aid. \$40 for 4 disks instead of \$60.
- A21 SUPER UTILITIES DISK. Has disk catalogue manager, menu maker, file manager, DOS command menu, text file reader and more
- A41 WORD PROCESSING. Contains a very useful text editor.
- BASIC & ASSEMBLER TUTORIAL. Very nice introduction to programming
- A101 COMMUNICATIONS. A collection of modem and utilities programmes for communicating with bulletin boards etc
- ACP102 COMMUNICATIONS. Requires CP/M and Z80 Board. MDM730 is a full featured programme already configured for Apple Contact bulletin boards, etc. with this exellent modern programme
- A121 ACCOUNTING AND FINANCE (1). Broad finance package that does budgetting, interest & loan calcs, values shares, bonds, annuities, etc
- A122 STATISTICAL ANALYSIS. Comprehensive selection of mathematical and statistical programmes including calculus, vector analysis, regression (exponential, geometric, linear, polynomial, etc.) mean, variance, standard deviation, chi square. F distribution, t test, Mann Whitney U test etc.
- A123 ACCOUNTING AND FINANCE (2) Programmes for depreciation, inventory, leases, stock market forecasting and trend line analysis
- A124 ACCOUNTING & FINANCE (3). Very useful business programmes for cheque payments and general ledger
- A125 ACCOUNTING & FINANCE (4), A menu-driven system for keeping track of personal accounts suitable for home-use and non-accountants. Easy to use.
- A126 SPREADSHEET. Basicalc is a comprehensive calculating programme in the spreadsheet tradition. Good documentation on the disk
- A141 DATABASE MANAGEMENT. An excellent public domain programme that supports two drives, an 80 column card, and most printers. Has good instructions and a help file. Has facilities for merging, editing, searching, etc. There is a sample on the disc
- A201 EDUCATIONAL GAMES. Requiring deduction. E.G. murder mystery, adventure (hunting monsters), Jigsaw puzzle (manipulating shapes), lotto, etc.
- **A202 EDUCATIONAL MIXTURE.** Being more assertive, additions, perimeter, area, linear equations, division, logic practice, etc.
- **A203** EDUCATIONAL MATHS. (Mostly primary level). Midpoint, ratios X-Y graphs, math-dice and a good ecology simulation.
- A204 EDUCATION PRIMARY MATHS. Includes additions, multiplication, roman and other numerals. Has timer to "beat the clock".
- A205 EDUCATIONAL MIXTURE. Programmes for speed reading, remedial reading, anagrams and maths equations, function graphs, polygonal patterns, prime numbers, sine, subtraction, tables, etc.
- A206 EDUCATION PHYSICS/MATHS. Vectors, kinematics, gravity, motion, momentum.
- A207 EDUCATION GEOGRAPHY. Quiz on countries, capitals, continents, has agriculture, water pollution, rainfall, salinity, users ber



Video-7 Enhanced Graphics Adaptor for the IBM PC family fully compatible with 256K EGÁ, CGÁ, MDA, and Hercules.

- 130% content the with all INV Enranced Graphics According on any 200 Eyes of as
- Fully composition with all product views democrats to IBM PC Industring the Color Facolitics Industrial (CGA). Management Legisland and AVDA, and Hercone Complete Cold (FGC)
- Supports at public SM PC reflices without seeds divers frequency Whou was Word, and Charl from Microsoft: 1 3/3 and Simphony from Lating SBM from Digital Remarch: Francisco Witch Autrop Take, Mirage from Zenacraches, in To Vecen and DPAW from Micrographs.
- Imports whereas prior cook or mare charter and system with system whereas it concerns higher trans-whereas sharing the PCs cone
- Shell Bakdiwan tih in anyticlotary SMRC XI, or At, or will a mail RC-correction including tol 5 of the PC/XII



DIMENSION GRAPHICS PTY. LTD. Incorporated in New South Wales

COMPUTER GRAPHICS SOFTWARE SPECIALISTS 201 Miller Street, North Sydney. 929 5855

# THE IMPORTERS OF MACE \$153, XTREE \$112, AND FORMTOOL \$295

introduce



DSBACKUP + is an invaluable hard disk software utility designed to quickly backup and restore any or all files from an IBM PC/XT/AT or close compatible

#### **FEATURES**

#### **NOT COPY PROTECTED**

This means you can install it and forget it, with no need for clumsy key disks.

#### TRUE DATA COMPRESSION

Now you can get even more data on each disk or cartridge — up to 40% more!

#### SPEED

No more waiting around — DSBACKUP+ backs up to 10 Megabytes in 5 minutes with its new SPEEBACK OPTION!

#### **MULTIPLE VOLUMES**

You can now backup and restore from more than one drive at a time,

#### **DIRECTORY & FILE SCROLLING**

Now you can scroll through all the selected backup files prior to the backup process and take full advantage of the Inclusion/Exclusion FILESPEC capabilities.

#### PERCENTAGE COMPLETION

DSBACKUP + is always updating your screen with information regarding the status of your backup.

#### INSURANCE YOU SHOULD NOT BE WITHOUT!

#### BENEFITS

#### DS BACKUP + IS SAFE

All the data you spent years accumulating is automatically verified while backing up and/or restoring, assuring you complete data integrity.

#### DS BACKUP + IS FAST

An entire 10 Megabyte hard disk can be backed up in 5 minutes (That's 10 times faster than DOS). Under normal operating procedures you will save valuable hours every time you back up.

#### DSBACKUP IS EASY

Completely menu or command line driven, all of the programming functions are clear and simple to follow during step by step backup/restore procedures. All the information you need is always on screen including single keystroke context sensitive help.

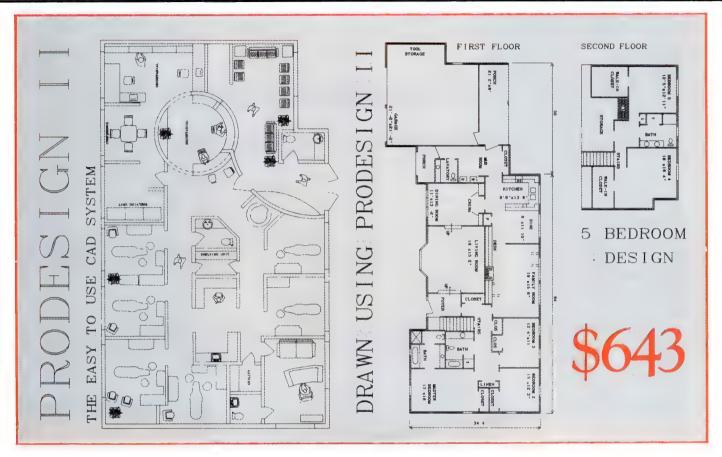
#### DSBACKUP + IS POWERFUL

With DSBACKUP+'s new power features such as True Data Compression and Data Specific Backups, DSBACKUP+ offers options that were formerly only available on more expensive tape drives and mainframe systems.

# ONLY \$195

PERFECT INTERFACE (AUSTRALIA) PTY. LTD. Level 8, 56 Berry St., N. Sydney NSW 2060 Phone (02) 957 6686	l enclose my cheque for \$ or please debit my American Express, Diner's Club, Visa, Mastercard or Bankcard plus \$6.50 freight.
Please send me copies of MACE, \$153 each.	Card expires Signature
Please send mecopies of XTREE, \$112 each.	Name Phone No
Please send me copies of FORMTOOL, \$295 each.	Address
Please send me copies of DSBACKUP+, \$195 each.	Company

# PRODESIGN II



The best feature of **ProDesign II** is NOT its low price.

The best feature of **ProDesign II** is NOT

its outstanding performance.

The best feature of **ProDesign II** is NOT its extensive hardware compatibility: 101 printers, 43 plotters, 5 mice, 20 microcomputers – with more being added!

THE BEST FEATURE OF PRODESIGN II IS ITS EASE-OF-USE

**ProDesign II** is a Computer Aided Design (CAD) system. It is a tool for Engineers, Architects, Artists, Designers.

In fact, it suits anyone who makes drawings. **ProDesign II** has the features of many

microcomputer CAD systems 8 TIMES the price!

With **ProDesign II**, you can produce a plotter-quality output on an ordinary dot matrix printer.

**ProDesign II** has all the features of a conventional CAD package, and it runs on your system.

With a standard IBM (or compatible) PC, 512Kb memory, graphics adapter and a dot matrix printer, you can produce – in just hours – drawings that used to take days to complete!

**ProDesign II** is fully-supported by Software Suppliers Pty. Ltd., with Hotline phone support, training, inexpensive programmes updates – and an absolute commitment to Service.

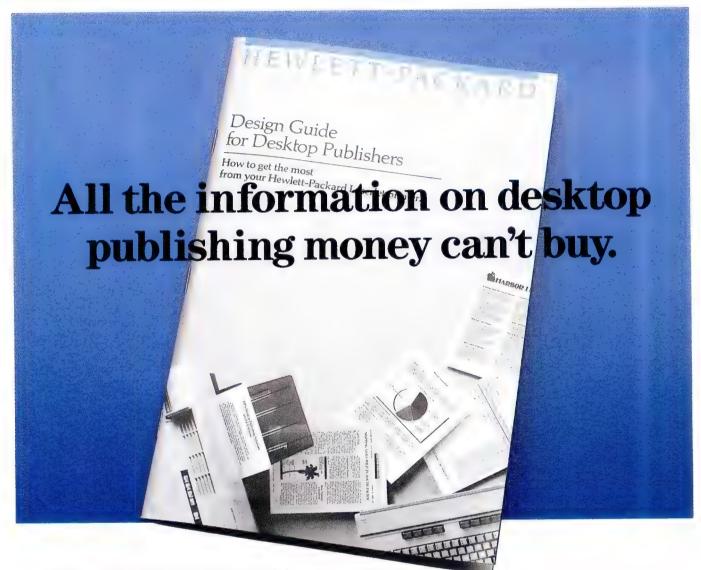
Optional 8087 co-processor support.

Ask about our Bill of Materials, Electronic, Electrical and Plumbing Symbol Libraries, and the AutoCAD™ Translation Pack!

## PRODESIGN II. Anybody can do it!

Registered Trademark ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE





It's the guide to desktop publishing. And it's free. Without any obligation. All 48 information packed pages. Now all the expertise and know-how of the world's leading name in desktop publishing, Hewlett-Packard, is yours, in one very valuable book, Design Guide for Desktop Publishers.

It will tell you about HP Laserjet Printer. The market leader. The one printer that delivers just what your business

needs in any form of printed office communication. It will also tell you more about the whole family of HP products designed to help you make the move to more sophisticated office printing. You'll discover how Hewlett-Packard provide a complete solution

To desktop publishing problems. From a complete system-printer, PC and software, to one that is an 'add-on' to the system you're now using.

This book says it all. Everything you need to produce memos, letters, newsletters, company reports, presentations or technical documents to the highest professional level.

Today no business can afford to be without it. And it's free. So there isn't a business that can't afford it.

Design Guide for Desktop Publishers. All the information on desktop publishing money can't buy. For

your free copy, simply fill in the coupon below. Or call us STD free 008 03 3821 (Melbourne residents phone 895 2902) and we'll mail your copy. Either way it places you under no obligation. So take some free advice. Find out about desktop publishing from the people who wrote the book.



Yes, please send me a free copy of Design ( Desktop Publishers. Name	Guide for
Title	
Company	
Address	
Phone	
Send to: Personal Computer Group Hewlett-Packard Australia Limited, Freepost 20, 31-41 Joseph Street, Blackburn, Vic. 3130 Ph: (03) 8952895	HP/APC/101



The best sales representative for our new QuietJet Plus printer from Hewlett-Packard, is the printer itself. It gives you a quiet, self-demonstration at the push of a button. It'll even show you a few examples of high quality graphics and text you probably can't print with your current equipment.

The wide carriage allows you to print an even wider range of documents, from short memos to financial spreadsheets with a full 132 characters. Perfect for 123 from Lotus, new QuietJet Plus will virtually hook up to anything. Sheet fed or continuous, it's so quiet you can carry on a normal telephone conversation without being disturbed.

A quiet, quality printer that sells itself. At a very affordable price. New QuietJet Plus is just the kind of business computing innovation you've come to expect from the company with 45 years experience in the field.

If you'd like to know more, simply fill in the coupon and invite our best sales representative into your office to sit on your desk and quietly convince you. Or call us on STD free 008 033821 (Melbourne

residents phone 8952902) and we'll arrange a demonstration at our office. The answer to more professional office printing is at your fingertips.



	business computing systems
	Yes, I'd like your best sales representative to quietly convince me.
	Name
	Title
	Business
	Address
	Phone
	Mail to: Personal Computer Group Freepost 20, 31-41 Joseph Street, Blackburn,

Vic. 3130. Telephone (03) 8952895.

HP/APC/101/Q

# Righting wrongs

In the fourth part of his series on data structures, Mike James examines the detection and correction of errors in programming.

This is part four of a six-part series on programming methods and the creation of programs. Parts one, two and three appeared in the July, August and September issues respectively, copies of which are available from APC Back Issues.

When you start to write a program, the last thing on your mind is the possibility of making mistakes — until a mistake is discovered, it's usually unthinkable! We all program as if perfection were not only possible, but the norm, and this is the programmer's cardinal sin. Errors are natural, and although they are each individually avoidable, it's very nearly a certainty that some parts of any program will have to be labelled as incorrect for one reason or another. Therefore, en masse, errors are not avoidable.

Of course, if you're thinking in terms of errors as nothing more than spelling mistakes (syntax errors in the jargon), you may be surprised by the assertion that errors are unavoidable because this particular class of error is easy to stamp out. But this is nothing more than saying that a piece of written text is correct because it has been processed by a spelling package — it can be correctly spelt, but can still be mostly nonsense. It's important to distinguish between simple errors of syntax and errors of meaning, expression and specification.

The current state of the art is that we have a fairly standard set of methods for testing and correcting programs, which have been in use for some time, and we are now turning our attention towards the more difficult problem of writing programs which are better at coping with the inevitable errors that they contain. Since the SDI (Star Wars) initiative, the whole subject of fault-tolerant programs has become much more urgent. It's proposed that a gigantic program should be written that, by the very nature of the situation it deals with — that is, a nuclear war - cannot be fully tested. In the future, our continuing existence may depend on the fault-tolerant programming.

#### Making errors

One of the most difficult questions to answer is: 'How do programming errors arise?' Programmers always start with the good intention of making no errors, but there are a number of important ways in which they are fallible and these give rise to distinctly different types of errors:

(1) Syntax errors — these are simple spelling mistakes produced by mistyping or a misinterpretation of the programming language manual.

'The most common method of bug location is the 'just looking method'. A print-out is obtained, and the programmer sits and looks at it...'

(2) Run-time errors — these are errors that only become apparent when the program is active. Run-time errors can occur because of some unforeseen, and hence uncatered for, condition or because of the type of inputs a program is presented with.

(3) Specification errors — these are failures of a program to meet its specification. In other words, the program may, in the usual sense, work, but it doesn't do what it was intended to do. It's possible to have a complete specification error where the program solves the wrong problem, but the shortcomings of a program are usually only partial.

Of the three types of errors, run-time errors are the most varied and the most difficult to characterise. They are also potentially the most devastating, occurring at any time during the life of the program and with consequences

which range from having to re-key a few commands to a complete failure or crash. For these reasons, run-time errors are currently the most important.

Before moving on to the subject of fault-tolerant programming, it's worth recounting current testing and debugging methods.

#### Debugging methods

It's important to distinguish between knowing that there is an error in a program, and knowing where it is: that is, bug detection as distinct from bug location, bug detection is generally called 'testing', and it's a phase of program development that is usually undervalued. Another problem is that testing is about proving that your program doesn't work, but most programmers test programs to prove that they do work! Even if you're prepared to attack your program in the spirit of making it fail, there's always the psychological barrier against showing that the product of your own intellect is, in fact, flawed. This is the main reason why some people are better at testing than others, and why it's better to use someone other than the person who wrote the program to test it.

To test a program fully, it's necessary to supply data that will take it through every possible route, and this is difficult. The number of routes through even a smallish program is enormous. Not only do you have to ensure that every route has been tested, you also have to test the program's response to extreme data values. Of course, the trap in this simple idea is in the word 'extreme', because what is extreme data depends on the situation: often included in the extreme data category are large numbers, negative numbers, zero, character data, control characters, and so on. But what constitutes appropriate test data relies on the judgment of the programmer to choose data that is likely to cause the program to malfunction - remember, the purpose of testing is to show that the program doesn't work.



Amiga system unit with 512K RAM. Amiga system unit with 512K HAM, built in 880K floppy disk drive, two button optomechanical mouse, Analog RGB monitor plus AmigaDOS, AmigaBASIC, AmigaTutor and Voice synthesis library. Price \$2495.00 RRP including sales tax.

#### AMIGA SOFTWARE

Analyze! Aquisition Financial CookBook Rags to Riches Scribble! Textcraft Unicalc VIP Professional Vizawrite	199 595 100 795 199 99 195 399 295
Halley Project	59.89
Keyboard Cadet	54.89
MasterType	69.89
Adventure Construction	69
Archon II/Adept	69.79
Arctic Fox	69
Borrowed Time	69.89
Brataccas	69
Deep Space	89
Hacker	125
Hitch Hikers Guide To The	69
Galaxy Leader Board Golf Little Computer People Mind Forever Voyaging MindShadow MindWalker One On One Racter Rogue Seven Cities of Gold SkyFox Temple Of Apshai The Pawn Trinity Wish Bringer Zork I Zork II Zork III	89 69 89 69 89 79 89 59 79 89 89 89 89
Aegis Draw Aegis Impact Animator Deluxe Paint Deluxe Print Deluxe Video	345 345 245 169 169
Construction Kit	245
Graphicraft	99
Images	169
Lattice "C" Compiler Lattice dBC III Library Lattice MacLibrary Lattice Make Utility Lattice Panel Lattice Screen Editor Lattice Text Utilities Delux Music Construction Instant Music Music Studio	245 195 195 245 345 195 195 245 149 89
BBS-PC!	199
Gizmoz	89
Maxicomm	195
Maxidesk	195
Online!	195
Supertext (Viatel)	102

PUBLIC DOMAIN DISKS 1-35 \$10 EACH SAVE!! LESS 10% ON ALL ORDERS FOR AMIGA SOFTWARE OVER \$200



#### your user friendly shop' 1216 Glenhuntly Road, Glenhuntly, Victoria, 3163 Tel. (O3) 572 2156

#### COMMODORE PC SERIES II

Why buy a No-Name brand IBM Compatible when you can have a Commodore PC. This quality PC is the most cost effective Name brand PC on the Australian market. 640K RAM, 2 x 360K disk drives and an AGA monitor card for complete versatility.

#### **PC 10 & PC 20 SERIES II**

Features hardware & software compatibility 640K memory AGA card 2 x 360K floppy drives (PC 10) 1 x 360K floppy + 1 x 20M hard drive (PC 20)



#### **PC 10 BUSINESS** PACKAGE

- 1 PC 10
- Sakata TTL Monitor
- 1 EP1201 Printer 1 Printer Cable
- plus paper and disks

#### **SUPER 5 1201**

The best printer in this price range for either IBM Compatible or AMIGA computers. 120 characters per second in draft mode, and switchable to NLQ or Condensed. with both friction and tractor feed.

Special Price This Month \$565 including FREE paper and FREE shipping

#### **PC 20 BUSINESS** PACKAGE

1 PC 20

\$2699

- Sakata TTL Monitor
- 1 EP1201 Printer 1 Printer Cable
- plus paper and disks

#### SUPER RITEMAN C+

The best printer for your Commodore 64 or 128 system, 120 characters per second, together with all the most desirable capabilities including NLQ that the others are not capable of. No interface required with this printer.

\$3649

Call for this month's special price including FREE paper and FREE shipping.

#### THE BEST IN BUSINESS SOFTWARE Q&A

Integrated database and word processor with Artificial Intelligence. Winner of 'Your Computer' Software of the Year

#### ATTACHE

Bullet Proof Accounting Software from the Award Winning Market

#### PRODESIGN II

Affordable CAD software which is capable of quality output on your

#### dot-matrix printer BUSINESS MANAGER II

Fully integrated accounting software now with optional Bill of Materials. Job Costing and Payroll.

#### Demonstration disks of Q&A

ATTACHE and PRODESIGN are available on request for a nominal \$5 which covers the cost of postage and media.

XIDEX DISKS	
3.5" SSDD	60
3.5" DSDD	65
5.25" SSDD	28
5.25" DSDD	38

#### PRINTERS

PC Parallel Printer	
Cables	30
Brother 1509	849
NEC P6	939
NEC P7	1198
Super 5 1201	565
MONITORS	000
Sakata TTL (Green or	
Amber)	249
Sakata RGB	490
MODEMS	
PC In-Modem	490
Netcomm 3 + 12	290
Netcomm 3 + 12 Auto	490
HARDWARE	100
EXPANSION	

Qubie 20 Meg Hardpack with Qubie 384K Multifunction card

#### COMMODORE 64 & 128 MODEMS TO SUIT COMMODORE 64 &

Blackbox Viatel Modem Communicator (Sendata) 199 Send for a full price list on Commodore 64 & 128 hardware and software, for individual prices please phone.

Bankcard, Visa, Mastercard, AGC Mailorder Telephone (03) 211 4584 Shipping \$3.00 For Mailable Items, \$8.00 each for computers printers and monitors

All prices include sales tax where applicable

and are subject to change without notice.



# icro//Mania

Accounting \$210

Modeni **\$429** 

Thomson EGA Monitor **\$999** 

Turbo Prolog **\$160** 

Bugboard Mono/Col/Her **\$295** 

8087-2 Maths Coprocessor

AST - Sixpak Plus + Sidekick ..... 

AST Rampage - AT 512K ..... EGA Compatible Card .....

AST - Megaplus - 64K

Produsiga II **\$599** 

> 950 633

699

1090 999

869

354

354

2539

280

280

240

159

114

130

299

. 35

75

#### SOFTWARE

SUFIWARE	
C Compiler - Microsoft	829
Chartmaster	625
Clickart Personal Publisher	289
Clipper	949
Cobol Compiler - Microsoft	. 1139
Crosstalk XVI	199
Daybook - Accounting Cashbook	169
Desktop Publisher	. 1049
Desqview	
Diagram Master	651
Disk Manager - Surpass 33 Megi	199
Fastgraphs	380
Flight Simulator	105
Fortran Compiler - Microsoft	620
Framework II	. 1060
Graphwriter	895
Harvard Presentation Graphics	
Harvard Project Manager	
Javelin	
Jet	
Macro Assembler - Microsoft	
Multimate 3.31	
Multimate Advantage	
Multimate Just Write	
Multiplan	
Newsroom	
Norton Utilities	
Paradox	
PFS File	
PFS Write	
Printshop	
Printworks	
Q & A	
Quality Analyst	
Quick Basic	
Rbase 5000	
Remote	
Samna III	
Sidekick	
Sideways	
Sign Master	
Spell Binder	
Spellbinder Desktop Publisher	1116
SPSS/PC Advanced Stats	
Statpak	
Super Calc IV	603
Superwriter	
Support Title I I I I I I I I I I I I I I I I I I I	017

Symphony	!	306
TK! Solver	'	483
Transporter		323
Turbo Async	:	225
Turbo Database Toolbox		104
Turbo Editor Toolbox		104
Turbo Gameworks		104
Turbo Lightning		161
Turbo Pascal BCD & 8087 Ver 3.01		151
Turbo Pascal Graphics Toolbox		104
		_

5	PRINTERS
5	PRIMILING
5	Brother 1509 859
3	Brother HR15XL 679
Ł	Brother HR35 1454
ł	Brother M1409
Ł	Brother M1109 429
Ĺ	Brother Twinwriter
L	Epson LX86
£	Epson FX105 1050



# For friendly and efficient service

#### Turbo Power Tools Twin - 123 Lookalike . . . . . . . . . . . . . . . Typequick ..... Windows & Mouse ..... Word - Version 3 .... Word & Mouse ..... Wordperfect ..... 652 Wordstar 2000+

Wordstar Professional ...... 479

Epson GX80
Epson LQ1000
NEC P6 Pinwriter
NEC P6 Printer 889
NEC P7 Printer
Star NX10 512
Star NB15 919
HARDWARF

80287 AT Maths Coprocessor ......

#### MODEMS

Seagate 20mb Hard Disk Kit . . . .

Turbo 286 - Speed Plus ..... Fuji DS/DD 3 1/2" Disks

Fuji DS/DD 5 1/4" Disks Fuji SS/DD 5 1/4" Disks

Netcomm PC In Modem 429
Netcomm 1200 In Modem 719
Netcomm 123 In Modem 1066
Netcomm 1234 In Modem 1398
Netcomm 2400 In Modem 1050
Netcomm 3 + 12 Manual 245
Netcomm Smartmodem 1200 770
Netcomm Smartmodem 1234A1550
Netcomm Smartmodem 2400 1071
Netcomm Smartmodern 123A 1220

Windows **\$199** 

Superkey .

Superproject Plus ...

Mirror **\$81** 

Miniscribe 71Mb Disk **\$3,499** 

why don't you call me!!

Christine - Micromania

AST 6 Pak + Sidekick \$375

8087 Maths Coprocessor ...

Wordstar 2000 **\$490** 

Fhomson TTL Monitor \$280

#### **KAYPRO** PRICES SLASHED!

KAYPRO PC \$2,195 **Dual Drives** \$1000 Free Software

KAYPRO PC20 \$2,799 20 Meg Hard Disk \$1000 Free Software

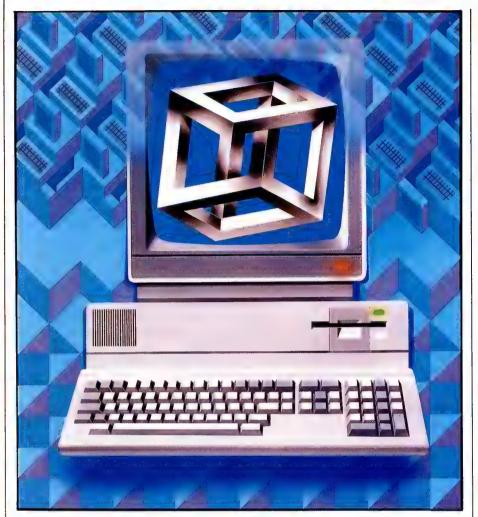
Australia's leading PC discounters

180 Parramatta Rd, Stanmore N.S.W. 2048

All prices include sales tax. We accept Bankcard, Mastercard and Visa. We have the largest range of PC products in Australia. Call us for a quote and a free catologue-newsletter. All products carry full distributors warranty and support and are latest release versions. Delivery extra - call for rates. Prices may change due to factors beyond our

l want	to become a Micromaniac today! I wish to:
	receive your latest newsletter and catalog with over 600 products listed.
	receive free registration on your Bulletin Board System
	be placed on your mailing list to be kept regularly up to date with latest product releases and special offers.
Name	***************************************
Comp	any
Addre	ss
	Postcode
Му со	mputer is

#### **PROGRAMMING**



It's usual for testing to proceed as the program is developed — stepwise testing is a natural partner to stepwise refinement (see last month's article) — but there's still a need for a final testing phase. Stepwise testing picks up problems as the program is being developed; final testing makes sure that the program is fit to be used. Although it sounds as though we know how to test a program, this is only a theoretical certainty; in practice, testing is still a matter of judgment about how best to use the limited time available.

When you have determined that there's a bug in a program, the next step is to locate it. The most common method of bug location is the 'just looking method'. A print-out is obtained, and the programmer sits and looks at it for a few minutes. This is a very effective method for a great many simple bugs. Indeed, often the bug becomes obvious in the time it takes for the printer to produce the listing! (This is one of the main reasons that most printer listings are thrown in the bin almost as soon as they are produced. Printing a program out is one of the standard ploys used by

programmers to give the impression and the comforting feeling that something is happening while they stand about and think for a few moments!) The trouble with just looking is that it's often the only debugging method a programmer knows, and it's a property of the method that if it's going to work, it works in, at most, a few minutes. There's no point in staring at a listing into the small hours of the night, cup of coffee in hand. Such tales of all-night debugging sessions are often an indication that the programmer involved knows little of logical fault finding.

Debugging is an activity that is just as logical as programming, and it's based on gathering observations about how the program is working and comparing this with information about how the program should work. This 'predict and compare' method has been in use as long as there have been programmers to create bugs. There are only two things that determine the behaviour of a program: the path taken through the statements; and the values stored in the variables. If you can predict the path through the program and the values of the variables at each

point, then by comparing these with the actual route that is taken through the program and the actual values of the variables, the bug can be located at the first place that there's a discrepancy between prediction and reality.

This procedure is simple in principle, but in practice there's the problem of gathering data on how the program works. This was partially solved many years ago by the first assembly language programmer by careful use of breakpointing. A breakpoint is a temporary halt instruction which allows

'Bugs should be reduced to an acceptable level, but it's better to admit that zero bugs is an impossible goal and try to find ways of dealing with ones left in a finished program.'

the programmer to verify the program's behaviour so far. Ideally, a breakpoint instruction should print a message indicating where it is, and allow the programmer to examine the contents of variables before restarting the program.

The nearest thing Basic has to a breakpoint is the Stop command, which will usually print a message to the effect 'Stopped at line xx' and will also usually allow direct printing of variables. Where the STOP instruction sometimes lets you down is in the way it allows a restart. Some versions of Basic have a CONTINUE command; in others, you have to use an explicit GOTO instruction to get things moving again. (The BBC Basic STOP command doesn't even allow you to restart successfully using a GOTO because it forgets all about any incomplete FOR loops, procedures, and so on, so negating its usefulness as a breakpoint command). Although breakpointing is the fundamental method of debugging, there are now many sophisticated debugging aids that will run a program, trace the path taken and print diagnostic information. However, no matter how sophisticated a debug package you are using, the principle of predict and compare is still the basis of locating bug.

#### The law of bugs

It's naive to assume that you can remove all the bugs from a program, no matter how much time you're prepared to devote to effective testing and debugging procedures. Although the

#### **PROGRAMMING**

perfect program is a logical possibility, it's a practical improbability. Bugs tend to die out slowly rather than give up *en masse* under pressure of debugging methods; this observation may seem unreasonable, but it's undeniable. Even programs which have been in use for long periods of time (10 years, say) still reveal previously undiscovered bugs. As you might expect, the time interval between such bug discoveries does increase with the life of a program, but the severity of such bugs does not decrease. It's still possible — and common — to discover fairly major bugs

# *Inside information:* flags

The most common use of a variable is to hold the result or raw material of a calculation or other data manipulation: that is, variables generally hold data values which the program works on. There is, however, another use for variables that is often ignored, especially by beginners. A flag is a variable that is used to indicate the state of some part of the program or of some external event. For example, a subroutine can return a flag variable, ERROR, which will be set to zero if no error occurred, and one if an error of any kind occurred. Flag variables are special because the only legal operations on a flag are to set or reset it, and to test it within an IF statement. In this sense, flags are message carriers within a program. There are two-state flags which can only be in one of two states: yes/no, on/off, stop/go, and so on. Two-state flags are easy to use if their values are either true or false that is, the values the system uses to represent the result of a true or false condition. Such flags are called Boolean or logical flags, and they make testing very easy. For example, if ERROR is a logical flag that's true when there's an error, you can write:

IF ERROR THEN GOSUB error handler

There are also multi-valued flags which can be used to indicate which of a number of possible states the program is in. For example, ERRTYP is a multi-valued flag if it records a number which indicates the type of error that has occurred. In more sophisticated multi-tasking applications, flags are transformed into an advanced data type called semaphores which are nothing more than flags with restrictions on how and when they can be set and reset. Don't be fooled into thinking there's anything much more complicated than a simple flag!

which cause the program to fail completely after a long and otherwise useful life.

Such long-term bugs are generally concerned with the coincidence of events, each of which is quite rare. For example, it might be that an operating system has been successfully tested with three users logged-on for many years, but it's only when three users logon at precisely the same moment that a bug which crashes the whole system is revealed!

Another type of bug which tends to show late in the life of a program is the bug which occurs often but which usually has only a small effect. For example, a word processor might contain a bug which causes the loss of a character on the boundary of a storage block — for example, every 32k characters. Normally, the loss of one character in 32k isn't noticeable, but if that character happens to be a text

'Programmers always
start with the good
intention of making no
errors, but there are a
number of important ways
in which they are
fallible...'

formatting command, then the error is easily spotted as the remainder of the document will be incorrectly formatted.

All of this is not an excuse for not trying to eliminate bugs from a program. Bugs should be reduced to an acceptable level, but it's better to admit that zero bugs is an impossible goal and try to find ways of dealing with the ones left in a finished program.

#### Exceptions

Given that you have applied sufficient effort to debugging, the only thing that you can do to improve your programs is to incorporate lines of code that are designed to cope with errors. The trouble with this idea is that if you could anticipate the exact nature of the errors and hence cope with them, you could alter your program to eliminate them. It seems that we have an impossible task. but there are ways of writing programs which guard against things going wrong, even if you aren't sure of the whys and wherefores of what might go wrong. This is called defensive programming and there are many varieties. For example, at the start of each subroutine, you might state certain logical relationships which have to hold between the variables before the subroutine is executed. This, of course, avoids the question of what should happen when an inconsistency is detected and this is the really difficult part of fault-tolerant programming.

These days, the most-used method of defensive programming is based on the idea of an exception. An exception is an unusual condition that arises during the execution of a subroutine. Once an exception has been detected, control is passed to an exception handler, a chunk of program designed to do the right thing when the exception is detected. For example, the expression A/B can only cause a problem in one of three ways: either the result is too small or too big to be represented: or B is zero and the division cannot be performed. In nontolerant systems these correspond to 'underflow', 'overflow' and 'division by zero' errors, and these are usually fatal that is, they cause the program to stop running.

In newer languages such as Ada, such errors can be made to cause an appropriate exception handler to take control rather than crash the program. Notice that none of this implies that we know the deeper reason why A/B isn't computable - for example, that a user has typed in an appropriate value or a hardware failure has occurred. It's enough to detect the immediate problem that would normally result in the termination of the program. What the exception handler should do is, if course, a different question, and this does depend on the role that the calculation which caused the error plays in the rest of the program. It might be enough to print an appropriate message and then return to some earlier point of the program, or it might be absolutely essential to stop the program from continuing.

Most versions of Basic contain a primitive exception-handling statement - ON ERROR GOTO or ON ERROR GOSUB. This statement causes the transfer of control to a subroutine should any error occur while the program is running. Most Basic programmers use this statement once at the start of a program to cause all errors to transfer control to a single, all-powerful errorhandling routine. This is, in fact, not the best way to organise things - it's too complicated to deal with all possible errors in one routine. It's much better to follow the example of Ada and guard each subroutine with its own exception handler. That is, instead of having one ON ERROR statement at the start of a program, each subroutine should start with an ON ERROR statement which

# FOR 100cps LETTER QUALITY PRINT OUTS, THIS IS THE STAR!!

If you want high quality, high speed printing, the NEW NB-15 15-inch printer from Star Micronics is hard to beat. In fact, it won't be beaten when you compare it to the competition.

For real value, you get all the features – 100cps Letter Quality and 300cps draft quality printing, a choice of typefaces, touch control operation, auto paper feed, push tractor feed, full IBM\* compatibility and 12 month warranty.

Plus the unique print buffer — 16K of built-in memory that lets the computer get on with the computing. There're no delays so you save time and money.

STAR NB-15

The Star NB-15

is one the most competitively priced printers available — phone today for the location of your

Distributed by:

GENISIS SYSTEMS PTY LTD.

Unit 7, 25 George Street, Homebush, Sydney. N.S.W. Australia. Area Code 2140. Phone 736-1144 Telex AA 73872. Melbourne call:

\*(03) 819 1050

\*IBM is a registered trademark.



nearest Star dealer.

names an error-handling routine for the type of error that might be expected from that subroutine. For example, if a subroutine is concerned with opening a file, then its error handler should deal with the possibility of 'No such file', 'Disk error', and so on, and not so much with arithmetic errors.

'We all program as if perfection were not only possible, but the norm. and this is the programmer's cardinal sin.

The introduction of exceptions and exception handlers effectively extends the principle of modular programming to make it fault-tolerant. In fault-tolerant modular programming, each module is composed of two parts: the part that does the normal work; and the exception handler. Unfortunately, exceptions are more difficult to handle than this simpleminded approach suggests.

#### Structure disruption

In the same way that many high-level

languages inherited the primitive constructs of the underlying assembly language, so exception handling is modelled on the hardware concept of an interrupt. An interrupt is a transfer of control without an explicit transfer statement at the point in the program from which control has been transferred. Usually, an interrupt is a transfer of control, initiated by the hardware, from

#### Answer to creative challenge three

If you sit down and write a program to draw a face as one long list of instructions, you'll be doing a great deal of unnecessary work; and when it comes to changing from rectangles to circles, the amount of work involved makes it almost easier to start from scratch. The best solution is to write a program using a subroutine structure that reflects the structure of the object which you are trying to draw. For example, at the top-most level of the hierarchy:

GOSUB 1000: REM DRAW FACE OUTLINE

**GOSUB 2000: REM DRAW EYES** GOSUB 3000: REM DRAW MOUTH GOSUB 4000: REM DRAW EARS

The subroutines at the next level — that is, 1000, 2000, 3000 and 4000, should in the same way call other subroutines to draw their specified 'sub-object'. For example, subroutine 1000 might be something like: 1000 REM DRAW FACE OUTLINE

1010 X=50:Y=50:GOSUB 5000:REM DRAW RECTANGLE 1020 RETURN

Subroutine 5000 is a 'low-level' subroutine which actually does some work - that is, it draws a rectangle. Notice the use of X and Y as input parameters. Constructing the program in this way makes it easier to complete, and easier to modify and re-use. For example, to convert to a face drawn using circles, it should only be necessary to alter the definition of subroutine 5000 — usually a matter of one or two lines of code.

#### YOUR DOT-MATRIX PRINTER IS CAPABLE OF PRINTING PERFECTLY FORMED LETTERS FROM 1/18" TO 10" IN ANY OF THE FOLLOWING TYPESTYLES

Times Roman Times Italic Clarendon Bld English Helvetica Medium Park Avenue ... and others

#### HOW?

With LePrint Typesetting software

#### **HOW MUCH?**

The introductory RRP for LePrint is only \$299 inc. Sales Tax

Phone OptSoft, the Australian Distributor for details of our 14-day free trial offer

> OptSoft Pty Ltd 261 Old Northern Road CASTLE HILL NSW Phone: (02) 680-3930

#### DEALER ENOURIES WELCOME

This advertisement was typeset using LePrint on an Epson FX80 Dot-matrix printer



#### An Innovative Video Series **Exploring the Frontiers** of Technology

asters Logic Programming: Prolog and its Applications
Balk Kanolski and Frank Kriton. 2ck. Imperial College, Landon
This program illustrates logic programming in action through a demonstration of a decision support system for the design and construction of a building it presents the growing range of applications of logic programming of the programming viewers will investigate the future of logic programming and its role in linking Al with new computer architectures.

AI MASTERS . . . a unique, unprecedented opportunity to learn the techniques and applications of Artificial Intelligence from the world's leading

AI MASTERS . . designed specifically for engineers and technical professionals, this comprehensive video series bediever state-of-the-art knowledge from internationally recognized pioneers in the field of AI baddresses, key issues through on-comera lectures interviews, case studies, and graphics integrates a 45-60 minute video tape and ten handbooks for mids utilal or group study.

Machine Vision: The Advantagement of the professional professi AI MASTERS . . designed

Oxford, Ingland
Examining both the cognitive
and the engineering aspects of
computer vision, this program
surveys the latest developments
are surveys the latest developments
to the program surveys the latest developments
to the program of the latest development
to stere it highlights the difficulties of technology transfer
in this area and underlines its
necessity Wiewers will learn how
parallel computers provide hope
and the computers provide hope
and the computers provide hope
and the computers in machinic
vision.

Machine Vision: The Advent of Intelligent Robots Muhael Brady, University of Oxford, England

Expert Systems: Automating Knowledge Acquisition Doubld Michn, Turing Institute Glasgoie, and Ivan Bratke, loseph Stephan Institute, Yugoslavia Stephan Institute, Yugoslavia Imphases is given to the crucial role of explanation lacitities in providing a "bridge of comprehension" between the experimental providing a "bridge of comprehension" between the experimental techniques to help awoud the "Feigenbaum bettleneck" in knowledge acquisition for expert systems. In-depth case studies of rale induction methods which provide them with a border range of current and future commercial applications. \$3950.

\$950

\$950

Additional programs in the AI MASTERS Series will be available in 1987, including Knowledge-Based Expert Systems: Planning and Implementation by Randall Davis, MIT

Knowlege Acquisitions: The Key to Building Expert Systems by Donald A. Waterman, Rand Corp

Applications of Artificial Intelligence by Patrick Winston, MIT

To obtain a preview video, or for further information, Susan Foley

#### Addison-Wesley Publishing Co.,

6 Byfield Street North Ryde 2113 Telephone (02) 888 2733



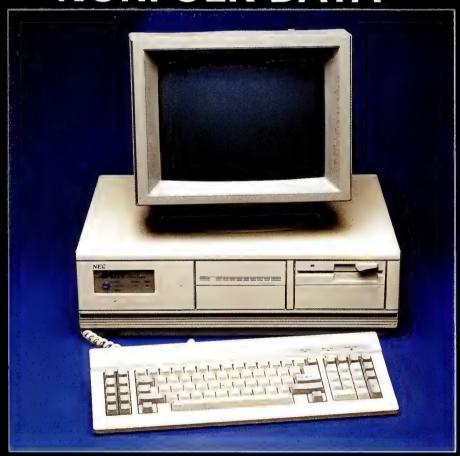
## **SEE THE NEW**

Sensational Xenix System V available now.



108 Megabyte hard-disk upgrade. \$3000 incl. tax. Available November.

(THE MASTER BLASTER)
NOW AT
NORFOLK DATA



# NORFOLK

**RING NOW** 

**SYDNEY** 

922 3544

35 Myrtle Street Crows Nest **MELBOURNE** 

690 5288

40 Park Street South Melbourne

BE QUICK — BE VERY QUICK

#### **PROGRAMMING**

any point in the program to a speciallywritten interrupt handler. In the same way, an exception is a transfer of control, without an explicit transfer statement, to an exception handler.

It has long been known that interrupts are difficult to work with due to the way that they ignore the hierarchical structure of the program, and exceptions are just as difficult for the same reason.

Some programmers argue that exceptions are an unnecessary idea because they can be replaced by explicit conditions for the execution of a statement that might cause an error. For example, instead of worrying about division by zero exceptions, you could program every piece of arithmetic as: IF B<>O THEN C=A/B ELSE error handler

The trouble with this is that it ignores the fact that errors generally disrupt the structure of a program. For example, if you are deep down in the hierarchy and a divide by zero error occurs within a subroutine, there's generally no point in going on with the subroutine, nor with RETURNing and continuing with the subroutine that called it, and so on, back up to the top-most level. When an exception occurs, it usually requires an out-of-the-ordinary sequence of events and hence a different sequence of subroutine calls to correct it.

It's this structure disruption that makes an exception an exception and not something that's part of the normal operation of the program. Currently, we build programs considering only their expected operation, and this is reflected in the hierarchy of subroutines built up by top-down structured programming; when something goes wrong, this

hierarchy is totally inappropriate, and the best we can hope for is a restart at another point in the hierarchy. For example, if division by zero is encountered in a subroutine, then there's no point in ending the subroutine normally and allowing control to pass through the hierarchy in the usual way, because the subsequent subroutines are probably going to make use of the result produced by the subroutine which has the error. Instead, what is needed is a restart at some earlier point in the hierarchy, perhaps at a subroutine that reads in the data which the subroutine with the divide by zero error uses.

The usual way of transferring control to an earlier point in the hierarchy is by way of a GOTO statement that ignores the structure of the program and transfers control back to the top-most level of the hierarchy - this is often referred to as a 'long GOTO statement'. In many versions of Basic, this long GOTO is achieved by use of the RESUME command to exit an error-handling routine. The use of the long GOTO statement is clearly against the principles of structured programming, but the only alternative is to build-in tests following every subroutine call that will detect an error and automatically return to the next level up, so automatically returning control all the way back up to the top of the hierarchy. For example:

start of subroutine GOSUB 2000

IF ERROR THEN RETURN

rest of subroutine

This kind of programming is tedious and complicated, and there's something to be said for recognising and making clear a situation that disrupts the normal structure of the program. The fact that error conditions disrupt the natural structure of a program has led many a programmer to claim that structured programming is itself inadequate. This is not the case. For the most part, the structure of a program should reflect its normal operation, but when something goes wrong it should be possible to make transfers that ignore its structure. It now seems clear that this is necessary, but the best way to do it is far from clear. Exceptions (and exception handling) is the best method we have at the moment, but it doesn't seem good enough to make Star Wars software sufficiently fault-tolerant to be trustworthy. Next month: repetition

nonth. repetition

END

#### Creative challenge four

This month's creative challenge can be posed as: 'How do you stop a program?' Given that you are convinced that you should use top-down structured programming to construct a program, what is the proper way of bringing a program to a halt if the condition that stops the program is detected by a subroutine very low down in the hierarchy? For example, if you are writing a games program and have a subroutine 9000 which asks the user 'Another Game Y/N', what should this subroutine do if the answer is N?

# Backs up CopyWrite IBM PC software

Hundreds of the most popular copy-protected programs are copied regularly. Copy-protected software is copied readily. **CopyWrite** needs no complicated parameters.

Requirements: IBM Personal Computer or XT; 128K-bytes of memory; one diskette drive.

CopyWrite will run faster with more memory or another drive.

CopyWrite is revised monthly, to keep up with the latest in copy protection. You may get a new edition at any time for a \$25 trade-in fee.

CopyWrite makes back up copies to protect you against accidental loss of your

software. It is not for producing copies for sale or trade, or for any other use that deprives the author of payment for his work.

To order CopyWrite, call with your credit card or mail a cheque for \$95, plus priority paid mail \$5 for CopyWrite or trade-in.

Aardvark Utilities, PO Box 133, HAWTHORN, VIC 3122. (03) 819 1996.



#### 100's OF COPYPROGRAMS

## **AARDVARK'S**

other utilities include:

Disk Explorer	\$100
Zero Disk	. \$100
SysteMate II	. \$120
SurMate Audit Trail	
Disk Manager	. \$100
Unlock	
Express Letter Processor	\$95
Ds Backup	

# The Cheapest

We offer you the opportunity to test our claims. The Computer House will better any price on any computer item from any other dealer. Try us, you won't be disappointed.

**Ring now** on (03) 699 2000.

#### **OUR GUARANTEE**

We guarantee to find you the lowest prices in Australia. The lowest prices on a complete range of products backed by Australia-wide maintenance and service.

Guaranteed Service. Guaranteed Savings. Guaranteed Satisfaction.

#### SOFTWARE

Spreadsheets			
Supercalc 4	\$425	Microsoft Windows	\$188
Lotus 123 Rel. 2	\$698	PC Alien	\$ 93
Javelin	\$1245	Languages	
V.P. Planner	\$178	Microsoft C compiler	\$786
MS Multiplan	\$344	Microsoft Macro assembler	\$348
Database		Microsoft Basic	\$648
O & A	\$498	Microsoft Quick Basic	\$169
Modula — 2	Call	Turbo Power Tools	\$214
dBase III plus	\$936	Turbo Pascal	\$128
Paradox	\$887	Turbo prolog	\$154
R Base	\$989		
Reflex	\$248	Accounting	
Clipper compiler	\$899	Breeze (Point of sale)	\$2760
Dataflex	\$1285	Dollars and Sense	\$259
Word Processing		Sybiz Book Worker	\$892
Leading Edge	\$349	Accounting 1	\$845
Multi Mate products	Call	T*A*O* Specialised accounting	
Wordstar	\$374	for accountants	Cal
Wordperfect	\$644	Also Sybiz, I.A.L., Integrity, etc.	Cal
Microsoft Word	\$698	Communications	
	4000	Crosstalk	\$159
Integrated	***	Reflection H.P. Emulation	Cal
Open Access	\$958	Smarterm	Cal
Framework II	\$1060	Carbon Copy	Cal
The Smart Series	\$1178	Entertainment	
Symphony	\$998	Jet	\$105
Enable	\$976	Zork I, II or III	\$ 74
Utilities		H/Hikers Guide to the Galaxy	\$ 77
Sidekick (Unprotected)	\$108	Gato	\$ 77
Norton Utilities	\$138	and many more	Cal
Mace + Utilities	\$145		Cai
X-Tree	\$ 98	Project Management	
Fastback	\$169	Harvard Project Management	\$694
Sideways	\$ 99	Super Project plus	\$548
Copywrite	\$ 98	Microsoft Project	\$657
Q Dos	\$119	Timeline	\$698

#### COMPUTER HOUSE SPECIALS

Software	
Symphony	\$998
VP Planner	\$159
Fastback	\$169
Super Project Plus	\$538
Hardware	
Leading Edge PC From	\$2589
NetComm Modems	Call
Epson LX86 Printer	\$464
Brother 1509	\$775

C......1' . .

#### HARDWARE

HARDWARE	
System Units Leading Edge from	\$2589
Profound (IBM compatible) XT's from	\$1495
Profound AT's from Profound XT Turbo from Olivetti (inc. monitor etc.)	\$3690 \$1650 Call
Epson Chendai	Call Call
Disk Drives Miniscribe 20Mb Seagate 20Mb (inc. Controller)	\$1120 \$ 995
Tandon 20Mb bigger than 20Mb	\$ 995 \$1039 Call
Hardcards The hardcard by Plus 20Mb	\$1670
Mountain Drivecard 20Mb  Tape Backup	\$1478
Internal & External M'Function & Memory Boards	Call
Hypertec Hyper-512 MF Hyperterc Hyper-512	\$398 \$249
Hypertec Hyper-256 Ram card with 384Kb (Short) M'Function XT	\$175 \$249 \$242
AST 6 pack Intel Above Boards	\$349 Call
AST Ram page PC  Display Cards	\$595
Hypertec Hypervid E.G.A. Paradise Autoswitch E.G.A. Hercules Graphics Cards plus	\$899 \$639 \$499
Hercules Graphics Cards Hercules Graphics Cards Hercules Colour Card (short)	\$265 \$346
Vega Card Many others from	\$615 \$175
Express Cards Hyper Ace 286 (6Mhz)	\$776
Hyper Ace 286 Plus (10 Mhz) And many others	\$854 Call
Monitors E.G.A. from Mono Green or Amber from	\$1030 \$ 199
Colour from NEC Multisync E.G.A & PGA	\$ 545 Call
Modems Netcomm Smart Modem 2123	\$ 518

Netcomm Smart Modem 123A

Complete Netcomm range Complete Sendata range

Netcomm Smart Modem 1234A

\$1158

\$1398 \$ 419

Supplies	
Complete range including	
diskettes, tapes, printer	
ribbons, paper etc.	Call
Printers	
Brother 1509	\$ 775
Epson LQ 1000	\$1299
Epson LQ 800	\$1083
Epson LX 86	\$ 464
Fujitsu DL 2400	\$1895
Fujitsu DX 220	\$1109
Seikosha	\$2490
NEC complete range	Call
Canon from	\$ 299
Other Boards and Peripherals	
Microsoft Mouse (Bus or	
Serial)	\$335
Power Supplies	\$199
3 Com Networks	Call
Plotters (H.P. or Roland)	Call
Cables	Call
Acoustic Hoods	Call
Printer Buffers	Call
Power filters	Call

REMEMBER THIS IS ONLY A SAMPLE OF OUR PRODUCT RANGE CALL NOW FOR THE PRODUCTS OF YOUR CHOICE.

#### PLUS

- Free Hotline Service
- Immediate\* replacement of any defective stock
- Training arranged
- Expert advice
- Australia wide maintenance

#### DELIVERY

- Anywhere in Australia for \$7.50 (under 3Kg.)
- Overnight on request
   Goods over 3Kg are charged at Post Office
- Prices are subject to change without notice
- All prices quoted include Sales Tax
- Terms: Payment on receipt of goods
   Bankcard, Mastercard,

Visa accepted
"We rent PC's, call

The

# **Computer House**

Phone Now (03) 699 2000

27-33 Raglan Street, South Melbourne Vic. 3205. Telex: 34145.

now for information"

# Truth tests

Human beings assess the authenticity or not of a statement by using their own experience and judgment together with the rules of deduction. But how does a computer emulate the human process of sorting out truth from untruth?

David Levy is your guide.

Knowing whether some particular statement is true or false is an essential element in most areas of decision making. An obvious example is computer programming — consider just how often a program contains code which is equivalent to: if such and such is true then do whatever.

Often we know the veracity of a statement or can discover it merely by looking in the right place. If we want to know whether the statement 'the sun is shining' is true or false, we only have to look and see. But life is not always so simple. Sometimes we need to deduce or prove the truth from one or more known premises, and while this may not be a difficult task for an intelligent person, it can be a highly complex one for a computer program. Consider a court of law, for example, where the objective is to ascertain the truth from the evidence. The judge and jury may deliberate for days or even weeks in their attempts to decide the truth, so can we really expect that a computer program might one day be able to do their work and provide a verdict a few seconds after digesting the premises?

Proof is an area that has always fascinated a significant proportion of the Al fraternity, and in some areas of mathematics, notably geometry and logic, computer programs have shown themselves to be rather adept at theorem proving. One of the earliest examples was the 'Geometry Theorem Machine', first described by Gerlerntner in 1959. which could prove theorems considered quite difficult by an average secondary school pupil. Quite recently we have seen a computer proof of the famous 'Four Colour Problem' (prove that using only four colours, it is possible to colour any map so that no two adjacent countries have the same colour).

#### The Geometry Theorem Machine

This was not a machine but a program

running on an IBM 704 computer. In the early spring of 1959 it proved its first theorem in elementary Euclidean geometry, and subsequently it discovered proofs to numerous problems found in school text books. Its 'knowledge' consisted of a number of rules or theorems on such subjects as parallel lines, the congruence of triangles, and the equality and inequality of segments and angles, and it employed heuristic methods to guide it towards proof sequences that had a high probability of leading to a proof of the original theorem.

The reason why heuristic methods are needed in theorem proving can be seen from a comparison between the proof process and the search of a game tree. Starting from the root of the tree (that is, the situation in which certain premises are given), the program could apply each of its known rules or axioms (which correspond to the legal moves in a game tree) to this root situation, thereby creating new situations (that is, new nodes on the tree). This process could then be repeated, so that at each stage of the search process every possible axiom would be applied to every existing unexamined node in the tree. Eventually a proof would be found (provided that one exists), because eventually the program would have generated a tree so big that it contained one path (that is, one variation) which converted the root situation into a proof.

The problem with the above approach is similar to the problem of trying to make the perfect move in a chess game by examining every legal move to a great depth. The tree gets too big too soon and the program's available thinking time is rapidly exhausted. An heuristic approach to theorem proving drastically limits the size of the tree, by selecting only those axioms which appear most likely to lead to a successful proof. (In fact, Gerlerntner's program employed a graph as its data structure rather than a tree. I have used the tree as a simplification because readers of this series will

already be familiar with tree-related concepts).

The Geometry Theorem Machine worked backwards from the desired theorem, so that every sequence it considered was known to end with a proof of the desired theorem. Most of these sequences will be false, but by using heuristic methods to recognise their falsity, these sequences could be immediately rejected, allowing the pruning of the irrelevant parts of the proof tree. Consider the flow diagram shown in Fig 1 which explains how the heuristic methods were applied.

- 1 Scan diagram With every theorem that needs to be proved, there is a diagram which is scanned by the program so that three lists can be constructed one containing every segment in the diagram, one containing every angle and one containing every triangle. Each item on a list is attached to a sublist which describes that item.
- 2 Set up initial conditions The premises are placed on a list of established formulae, and the conclusion is put on the tree as a subgoal. If this subgoal is achieved, then the program has proved the theorem.
- 3 Expand definitions Certain definitions are added to the list of established formulae.
- 4 Choose generating subgoal The program selects a subgoal which it wants to establish. Selecting a subgoal is analagous to a game-playing program selecting which position on the game tree should next be expanded.
- 5 Generate lower subgoals Appropriate axioms and theorems are chosen from the list of premises and, by working backwards, a set of lower subgoals is established such that if any one of these subgoals is achieved, then the parent subgoal is established. If the parent subgoal has been labelled 'provisionally fruitful', the program tries various geometrical constructions.
- 6 Discard unwanted lower subgoals The program rejects any of the newly created subgoals which are seen



Australian Personal Computer Page 123

#### ARTIFICIAL INTELLIGENCE

from the diagram to be obviously not valid. If it finds any newly created subgoals which are the same as or equivalent to any subgoals already on the tree, it rejects those deepest in the tree as being achieved with more steps than necessary.

- 7 Is the generating (parent) subgoal established? If any newly created subgoal is established by virtue of the fact that it is on the list of established formulae (or if it can be assumed from the diagram) then the parent subgoal is established, otherwise:
- 8 Add acceptable lower subgoals (if any exist) to the tree The program adds acceptable non-redundant lower subgoals to the tree and chooses a new subgoal from which further subgoals may be generated. If there are no acceptable lower subgoals and a geometric construction is possible in the diagram, then the parent subgoal is marked as 'provisionally fruitless'. If a construction is not possible or if the program has tried and failed to find one,

the parent subgoal is marked 'fruit-less'.

- 9 Are there any parallel subgoals to be established? If the parent subgoal is established it is added to the list of established formulae, together with all of the higher subgoals on the tree which are established as a direct result. If there are no parallel subgoals (sibling subgoals are said to be 'parallel' if it is necessary to establish all of them in order to establish the parent subgoal) remaining to be established, the program realises that it has found a proof of the theorem and prints it out.
- 10 Failure If at any time the program discovers that every unexamined subgoal on the tree is fruitless, the program admits that it has failed to find a proof of the theorem.

Most of the intelligence in Gerlerntner's program resided in blocks 4, 5 and 6 of the flow diagram, where subgoals are chosen, generated and discarded. He discovered that a linear increase in the number of points in the original diagram would lead to an exponential increase in the complexity of the proof process, and it was, therefore, essential to employ powerful heuristics.

Clearly it is desirable to be able to select those subgoals that have the greatest chance of leading to a proof, just as in a game tree it is desirable to select those moves which have the greatest chance of being correct. Two specific heuristics were used to achieve this aim. The first would recognise subgoals that could usually be established in one step, such as geometric identities. The second was a scoring function, analogous to those used in game-playing programs, which problem-solving assigned a score to each subgoal according to how close or far it appeared to be from the premises. Adding these two heuristics not only speeded up the proving process, it also resulted in the program finding shorter (that is, more elegant) proofs.

# Proving theorems in logic

The Geometry Theorem Machine is an excellent example of simple proof techniques being used in a specialised environment, that of Euclidean geometry. To be of more general use, a proving program must be able to cope with a wide range of problem environments, and for this reason much of the work on computerised proof has concentrated on mathematical logic. (The laws of logic are sufficiently general that they may be fitted to any problem-solving domain).

In the mid 1950s Newell, Shaw and Simon devised a program called the Logic Theory Machine, whose task was prove theorems in elementary symbolic logic. This system of logic is founded on expressions built from combinations of basic symbols. Five of these expressions are taken as axioms, and there are rules by which new theorems may be inferred from the axioms and from other theorems. The system of axioms, definitions and rules employed in the Logic Theory Machine was exactly that used in Principia Mathematica by Whitehead and Russell, one of the outstanding 20th century books on mathematics. These are:

if (p is true or p is true) then p is true
if p is true then (q is true or p is true)
if (p is true or q is true) then (q is true
or p is true)

if [p is true or (q is true or r is true)]
then [q is true or (p is true or
r is true)]

if (if p is true then q is true) then [if
 (r is true or p is true) then (r is true
 or q is true)]

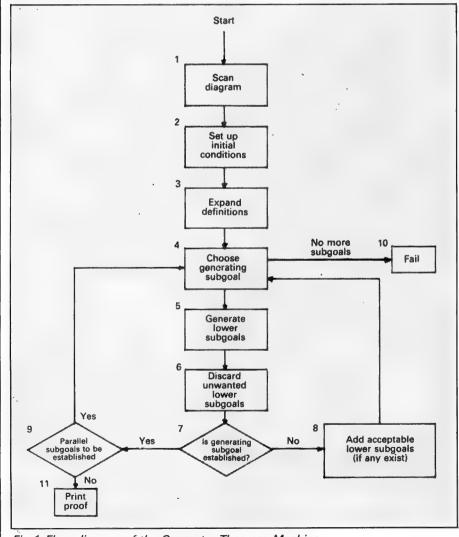


Fig 1 Flow diagram of the Geometry Theorem Machine

# INTERLINK VIATEL

INTERLINK VIATEL is a complete videotext package for the IBM PC and compatibles or the Apple II plus, Apple IIe or Apple IIc. INTERLINK will allow access to Viatel or any standard videotext based database service.

All versions include a telesoftware downloader facility for retrieval of data files and programs from Microtex 666 and other software services. Frames can be saved to disk as files and retrieved later. The lengthy I.D. code of Viatel can be automatically transmitted, leaving the user to enter only the PIN number

Special symbols, including the complete Presetel character set, is implemented (with both flashing and reveal/conceal attributes). **INTERLINK** does not require a baud rate converter. It works equally well with "intelligent" Hayes type modems, or it can be used with conventional "dumb" modems. For computers that transmit or receive at 1200/1200 only, **INTERLINK** will compensate in software. **INTERLINK** is, best of all, extremely *easy* to use! One help menu tells you all you need to know about the program. Frames may also be dumped to printer for hard copy purposes.

#### **IBM VERSION**

- Interlink now supports either the colour graphics card or the Hercules graphics card.
- Talks to either serial port.

#### **APPLE VERSION**

- Alternative character sets including English, German, Swedish, Italian and Belgian.
- Works fine with the Super Serial card and is slot independent.

\$84.50
(02) 349 2366
DEALER INQUIRIES WELCOME!



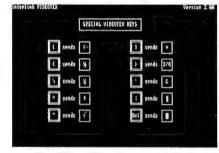
Connect to Viatel and Other Data Bases.



Easy to use Menu System.



Log on to Videotext Data Bases.



Send Special Videotext Key Codes.





CONSULTANTS TO THE MICROCOMPUTER INDUSTRY

183 Maroubra Road, Maroubra Junction, N.S.W. 2035

THE AUTHORIZED DISTRIBUTOR

#### RTIFICIAL INTELLIGENCE

The Logic Theory Machine was given a number of true theorems, and three rules that could be used to infer new theorems:

(a) The rule of 'substitution':

Any expression may be substituted for any variable in any theorem, provided that the substitution is made throughout the theorem wherever that variable appears. For example, in the second axiom, if we replace the variable 'p is true' by the expression 'p is true or q is true', we get the new theorem:

if (p is true or q is true) then (q is true or {p is true or q is true}) (b) The rule of 'replacement':

Words such as 'or' and 'implies' may be replaced by their definitions, and vice

By definition, 'if p is true then q is true' is equivalent to 'if not-p is true or q is true', so that if 'p' means 'this is a ball' and 'q' means 'this is round' we can see that the theorem:

'if this is a ball then this is round' is equivalent to

this is not a ball or this is round because if the expression 'this is not a ball' is false, then clearly this is a ball, and therefore it is round.

As an example of replacement we can replace 'if p is true then' by 'if not-p is true or' in the second axiom, and we get the new theorem:

if p is true then (q is true or p is true) (c) The rule of 'detachment':

If 'A is true' is a theorem (that is, it is true), and if

'if A is true then B is true' is a

theorem (that is, it is also true), then 'b is true' is also a theorem (that is, it too is true).

For example, if the following is a theorem:

if\*[if (p is true or p is true) then p is true|\* then (if p is true then p is true)

then since the expression between the two asterisks is known to be true (it is the first axiom) we have the new theorem: if p is true then p is true

#### The Logic Theory Machine at work

In essence the method is similar to the tree expansion method described for the Geometry Theorem Machine. A crude way to prove a theorem is what Newell, Shaw and Simon called the 'British Museum Algorithm'. Make the theorem the root of a tree and then apply all the possible substitutions, replacements and detachments, each of which would create a new node on the tree. Each of these nodes could then have applied to all the possible substitutions, replacements and detachments, and so on. Eventually, if the program did not run out of time or memory, it would create a node which corresponded to one of its known theorems, and it would then produce a proof of the original theorem by traversing, in reverse order, the steps from the newly created node (corresponding to an existing theorem) back up to the root of the tree.

Obviously this brute force approach

will exhaust the available computation time and computer memory for all but the very simplest of theorems. Using this method, and being allowed three iterations (which created proofs for 42 new theorems), the Logic Theory Machine was only able to solve one of the 60 or more theorems in Chapter 2 of Principia Mathematica. Three more proofs were achieved after two further iterations (that is, within the first 115 new theorems), one more within the next two iterations (that is, the first 246 new theorems), and one more within the first 1000 new theorems. In order to avoid creating useless theorems, the program therefore needs some heuristics to enable it to select which substitutions. replacements and detachments should be applied, and other heuristics to determine the nodes on the tree to which they should be applied.

A powerful heuristic employed by the program is called 'chaining'. If the program encounters a theorem of the form:

if A is true then B is true which it needs to prove, it searches for an axiom or theorem of the form:

if A is true then Z is true and if it finds one, it knows that it can prove the previous theorem by proving the theorem:

if Z is true then B is true

When a new problem is presented to the Logic Theory Machine, it first tries substitution, using all the axioms and theorems that it has been told to assume and which are already stored in its

#### Advantages:

- Compatible with most micro-computers and operating systems
- No special hardware required User definable backup procedure
- Splits large files
- Bad sector lockout Fault tolerant menu driven restoration
- No cryptic commands required Automatic error detection and correction
- Informative printed reports

More Than Just A Backup Program

Unlike other Backup programs,BackRest provides much more than just file copying and splitting. It is an advanced file recovery management system for the serious office environment that needs data security. BackRest makes it simple to restore in any way desired. You can restore the entire hard disk or a single file or a group of files in one request through a menu driven restore process.

Intelligent Operation

With complete security BackRest can backup and restore password protected files (if your system supports file protection).

BackRest is the only backup program that correctly copies sparse files that some database programs create.

BackRest will provide you with a detailed report of its backup/restore operations. If you have someone run your backups nightly, this report can be waiting on your desk the next morning.

# ${f BackRest}$

The Fault Tolerant Hard Disk **Backup and Restore Program** 



PO Box 374, TURRAMURRA N.S.W. 2074 Telephone (02) 449 4721 CCESSORIES PTY LTD

Broad Compatibility
You can select BackRest for any single-user or
multiuser computer running any of the popular
operating systems such as PC-DOS, MS-DOS, CP/M
2.2. CP/MPlus, MP/M, CP/M-86, MP/M-86, Concurrent
CP/M, Concurrent PC-DOS, and Turbo DOS. BackRest
is certified for use on Local Area Networks such as PCNET, CP-NET, and OMNI-NET as well as StarLink.

System Configuration

BackRest is useable in many different ways. You can tell it what files to skip if you only want to backup certain files. You can tell it to delete certain files (such as temporary files) to keep your hard disk from getting

Specifications:

Source media: Destination Media:

Files size: Number of files:

Backup time:

Any hard disk. No size limits Any removable disk for destination First time if full-1 hour per 10

meg.
Daily backups · Only modified files are copied.
Average 10 minutes.

No limit. No limit. Program size: Memory requirement:

Approx. 32Kbytes. 48 bytes minimum.

# WE TAKE EXTRA CARE to bring you a quality product.

CET WOAR

**Mandalli Mandalli** 

# **-X2**TURBO

- 40K RAM on board
- 8088-2 CPU Monochrome Display Card
- Floppy Disk Controller Card.
- 2 Floppy Disk Drives (360K)
- Keylock Switch.
- Power Light,
- Turbo Light.
- Reset Button
- 150 Watt Switching Power Supply
- 84 key, AT style Mechanical Keyboard.
- 12-inch Monochrome Monitor.
- \* Phoenix BIOS

## CET gives you more for less.

Four days of burn-in testing goes into every CET computer. Not only the board, but the CPU and every chip on the board are tested continuously with data - for four days.

#### Our Turbo doesn't cause I/O burn-out!

Some turbo-PCs give you 8 megahertz... for three or four months. Then the I/O starts acting up. CET's PC delivers the 8 megahertz... but without the problems. We discovered what the problem was and fixed it.

The CET Turbo carries a one-year warranty. But if, for any reason you don't like it, send it back within the first 30 days and we'll give you money back. Immediately. With no questions asked!



**Chino-Excel Technology Corporation** 

9th Floor, Chung Shan N. Road Section 2, Taipei, Taiwan, R.O.C. Phone: (02)563-8652 Telex: 21540 HTC Fax: (02)531-3241

#### ARTIFICIAL INTELLIGENCE

theorem list. If substitution fails, the program tries detachment, and as each new subproblem is created by a successful detachment, an attempt is made to prove the new subproblem by the substitution method. If substitution still does not work, the subproblem is added to a subproblem list.

If detachment fails for all the theorems in the theorem list, the same cycle is repeated with chaining — try to create a subproblem; try to prove it by sub-

stitution; if unsuccessful, put the new subproblem on the list. If substitution ever succeeds with a single subproblem, the original theorem is proved.

If these methods have been tried on the original problem and no proof has been found, the next untried subproblem is taken from the subproblem list and the same methods are applied to this subproblem. This process continues until a proof is found, or until no more subproblems remain on the list, or until time or memory is exhausted.

In order to determine which theorems on the list should be tried for substitution, replacement and detachment, the program employs a type of evaluation function called the 'similarity test'. Two logic expressions are said to be similar if both their left-hand sides look alike and both their right-hand sides look alike. (There is a more rigorous definition of similarity employed in the program). For example:

\*if p is true then\* (q is true or p is true)
and

\*if r is true then\* (if m is true then r is true)

are similar, because the expressions between each pair of asterisks are of exactly the same form, and the expressions to the right of each right-hand asterisk are similar because (*if* m is true *then* r is true) is similar to (not-q is true *or* r is true), as we have seen in the example of replacement given above. The similarity test reduces substantially the number of substitutions, replacements and detachments attempted at each node, in some cases by a factor of 10

Although the Logic Theory Machine was one of the forerunners in the field of automatic theorem proving, it was able to prove 38 out of the 52 theorems in Chapter 2 of Principia Mathematica. During the three decades that followed this pioneering work of Newell, Shaw and Simon, theorem proving has become one of the most prominent areas of Al research. There is now a plan at McGill University, Montreal, to hold the first 'World Theorem Proving Championship', in which programs will be awarded points for successfully proving a number of test theorems in elementary logic. This idea was conceived by Professor Monty

#### Bibliography

Gerlerntner H (1959): Realization of a Newborn, who was one of the organisers of the very first computer chess tournament (held in New York in 1970), and if the world of computer chess is anything to go by, such an event might provide the stimulus for the creation of programs that can perform at the level of a mathematics PhD.

Geometry Theorem Proving Machine. Proceedings IFIP Conference, Paris, pp273-282.

Newell A, Shaw JC and Simon HA (1957): Empirical Explorations of the Logic Theory Machine: A Case Study in Heuristics. Proceedings of the Western Joint Computer Conference, pp218-230.



# URGENT INFORMATION FOR ALL MODEM USERS.

Using a modem not authorised by Telecom could be unsafe. It could cause electric shocks – to both you and our workers on the lines.

It could damage the telephone network and interfere with other people's conversations.

So look for the Telecom Authorisation number on any modem that you buy.

For example: C86/37/2134

- -C shows authorisation by Telecom.
- -86 is the year of issue.
- -37 is the type of modem.
- -2134 is the identification number.

Using an unauthorised modem could lead to a fine, possible disconnection of your service and you may be liable for damages. If you are unsure whether your modem is authorised, first contact your supplier. If further information is needed, phone Telecom on:

NSW	(02)2651804	SA	(08)	2179292
VIC	(03)6065770	TAS	(002)	208800
QLD	(07)8358249	<b>ACT</b>	(062)	45 5555
WA	(09)4207477	NT	(089)	893233



USP TAT 1994

# Three firsts give you the Leading Edge...



To offer a 30MB hard disk as standard and at a very attractive price.



To offer FREE the brilliant Leading Edge word processing software ALONG with MS DOS 3.1.



In quality computers that are designed with user needs in mind.

The point is that the serious buyer must take a close look at Leading Edge Computers before making that computer purchase decision.

Leading Edge has 3 other bests that weigh heavily in its favour. These are its dual mono and color display ability, its outstanding AT style keyboard, (especially good for the expert typist) and the best documentation available; all packaged at a price that is one of the lowest for compatible computers...certainly savings rank in the 4 digit

area over other brand name products.

The winning sales concept however, is that Leading Edge computers provide everything you need to get up and running - STRAIGHT AWAY - as a basic low cost quality package -PLUS - a 12 month warranty which simply put you and Leading Edge a year ahead of the competition.



**Computer House** 

Phone Now (03) 699 2000

27-33 Ragian Street, South Melbourne Vic. 3205, Telex: 34145. Queensland Dealer: Tully Compu-Print Shop 324 Riverside Shopping Centre, 150 Graceville Avenue, Graceville, 4075. (07) 379 5100 or 379 5218



computer enhancements ptv. ltd.

9th Floor, 505 St Kilda Road, Melbourne, 3004, Australia Telephone (03) 267 7829, (03) 267 4755

# **UPGRADE YOUR PC**

Make it stronger than the AT

ALL PC/XT COMPATIBLE COMPUTERS.

#### "ECCEL FLASH"

IBM PC/XT COMPATIBLE

Nearly 4 times as fast

check our incredibly low

price.

#### GRAFX-PRO

- 132 COLUMN CARD Monochrome graphics (132 x 44)
- Parallel printer port
- Spectrum graphics card compatible
- 4 layers

#### NETWORK CARD

- · No dedicated file server

- Floppy disk sharing Transparent to DOS Trans-Net Spool (Printer Files Spooling) Enhanced networking
- DOS command

#### PC SPEED

#### SPEED CARD

- Increases IBM PC speed by over 200%
   Ultra-fast 10MHz 8086

- Simple plug-in installation Compatible with existing software; Lotus 1-2-3, Wordstar, dBASE III, etc.

#### SHORT - EGA CT -8090

- 100% Hardware and software
- Thurward and Survaire and Survaire compatible to IBM EGA card
   Supports IBM CGA + MDA
   Bit mapped in 4 planes
   640 x 350 res in EGA mode
   640 x 200 + 320 x 200 in 16
  cols for CGA, 720 x 350 for Monoch
- Soft scrolls, pans and windows through a im-pixele memory
   Supports 256K of memory using 64K v 4 drams

#### DEC - VT 220 TERMINAL CARD

- ★Full VT 220 Emulation ★ Parallel/Serial Printer
- Selectable ★ Monochrome TTL or Composite Video Monitor
- Selectable ★ File Transfer: Upload/Download

#### SPEED + TURBO — 286

- Increases PC speed by 900%
   8MHz 80286 Processor
   Socket for 80287
   IMB RBM installed
   Expandable 2MB on board
   Software selectable 8088 or 80286 operation
- 80286 operation Runs all popular programs

#### ZAP

- Speeds up disk I/O access Disk I/O intensive progs like dBASE II will run 2-4 times faster
- Easy to install Safer than RAMDISK

#### GRAFX-PRO +

- Fully IBM EGA compatible
   Full 256 RAM screen buffer on board
- 640 x 350 res in 16 colours
- Extra printer port

#### MULTI DISPLAY CARD

- 132 COL x 25/44 lones text mode
- Software control display mode Hardware control color mode or

- Nonflicker display Compatible with IBM color adapter
- & Hercules graphic card 132 column can use for word star
- Lotus 1-2-3 in monochrome text mode

#### X - RAM - 2

- Lotus/Intel above board compatible
   Extra ram may be divided between conventional and EMS RAM
- Fully populated with 2MB RAM RAM disk
- Disk cache
- Printer huffer

#### 1.2MB FLOPPY CONTROLLER

For IBM-PC/XT or PC/AT will read/write 360KB or 1.2MB disks in drive

#### MINI - AT MOTHERBOARD

- Replace your PC/XT M/B & upgrade to PC/AT
   Pits existing mounting
   6/8MHz operation

#### INSTRUMENTATION/ CONTROL

- Full range of cards
  A/D, D/A
- · Optical input
- Relay output
- High speed A/D
  JTR thermacouple, etc.

#### XT SPEED - DIGIS **- 286**

- ★ Increases PC Speed by
- ★8 MHZ 80286 Processor ★ Sockets for 8088 and 80287
- ★ Hardware selectable 8088/80286 Operation
- ★ 8K Local Cache Ram
- ★ Takes Up Only Half Slot ★ Fully DMA Compatible.

# 80 x 25 OR 132 x 25/44 mode 64K bytes graphic ram 720 x 348 Graphic mode Can directly run Lotus 1·2·3, tocad, Framework, Symphony

PRINTER CARD

MONOCHROME/GRAPHIC/

- No scrolling noise

  Hercules Version 2 compatible
  Software L basic (mono/graphic) Software mode change

#### STOP PRESS

ECCEL-286" COMPUTER

#### THE FASTEST IBM-PC/AT COMPATIBLE ALTERNATIVE

TWICE AS FAST AS THE "AT". AT LESS THAN HALF THE PRICE

#### Specification:

- **★MOTHERBOARD**: 100% compatibile bus and form
- compatible CPU board **★MICROPROCESSOR** 10MHz 80286-8 16/24 CPU ★ MEMORY: Expandable on-
- board to 1M-bytes \*DISPLAY: Color Graphics or Monochrome, also optional Enhanced Graphics Adapter or
- 132 Column cards ★I/O PORTS: 4×RS232 Serial and 1× Centronics Parallel on board.
- ★EXPANSION SLOTS: 8 I/O slots,  $2 \times \text{single } 62 \text{ pin, } 6 \times$ dual 62 pin and 36 pin
- ★POWER: a large 200 Watt power supply standard

3.0, 3.1, and Xenix

\*LANGUAGES: Basic, Fortran, Cobol, APL, Pascal, Macro, Assembler

**★OPERATING SYSTEMS: DOS** 

#### Now offered one

YEAR WARRANTY

with

- LEGAL BIOS
- LICENSED MS-DOS 3.1

#### **ECCEL MINI-AT**

- The Small System With The Big Performance But Small Price Tag.
- ★XT size unit with full AT specifications.
- ★10MHZ 80286 processors with 80287 support.
- ★Fits all standard PC/AT Cards.
- ★Fully 100% software and hardware compatible with IBM PC/AT (But twice as fast).
- ★1 Meg memory on board.
- ★ Suitable 6I10 MHZ operation.
- ★4 Layer motherboard, 5 custom chips.



## **SCREENTEST**

# Smalltalk V

Smalltalk is a programming language which, after various incarnations, has manifested itself as Smalltalk/V, a versatile tool for the development of a wide range of applications. Carl Phillips engages it in conversation.

At the beginning of the 1970s, Xerox Corporation created its famous Palo Alto Research Centre (PARC). PARC's Learning Research Group, under the leadership of Alan Kay, embarked on a 10-year research project concerned with the Dynabook - a notebook-sized computer which anyone could use, and which was so convenient that you could use it to store and manipulate your grocery list (a test still failed by the personal computers of today).

To accompany the Dynabook, the Learning Research Group began to design a new programming language. The Learning Research Group credits the simulation language Simula (a Norwegian derivation of Algol 60), Sketchpad (the first interactive graphics program) and Lisp as the major influences on its

design.

#### History

The Dynabook programming language was named Smalltalk after the conversation at parties and as a reaction to the grandiose names of other research projects. This research led to the development of a series of Smalltalk languages, each inspired by its predecessor, culminating in 1980 in the Smalltalk-80 (trademark Xerox). The Learning Research Group documented the Smalltalk research in the August 1981 issue of Byte, in a series of technical papers, and in three books published by Addison-Wesley.

The Smalltalk research has prompted many of the recent developments in personal computing. Xerox's ill-fated Star, Apple's Macintosh, and windowing environments such as Microsoft's

Windows or Digital Research's GEM, are all directly descended from the Xerox research. Mention Smalltalk, and most computer users say: 'Oh, yes! Windows and mice . . . inspired the Macintosh.'

Although important, windows and mice are only one part of the Smalltalk research. The Learning Research Group consistently applied a small number of innovative ideas in the design of a integrated programming environment. Everything you would traditionally use in developing a program - programming language and compiler, text editor, operating system and utilities, linker, debuggers, profilers, source code change management facilities, and application programs are all built into a single, unified whole.

Smalltalk was designed to run on Dynabooks' powerful experimental Xerox personal computers. These systems, built in the 1970s, were based around the high-speed logic families used in minis and mainframes. Unlike microprocessor-based systems, the CPU instruction set was microcoded, and could be redefined by a programmer to gain speed and optimise performance for particular applications. Even today, personal computers are only just reaching the raw performance levels of these early PARC systems. The original Smalltalk implementations made extensive use of microcode to gain adequate performance, and even taxed the resources of these powerful PARC computers.

The Dynabook was envisaged as using some kind of liquid crystal display that would mimic a full page of paper, so the PARC computers were equipped with high-resolution, A4, bit-mapped

graphics display and a little-known pointing device - the mouse.

The Learning Research Group held a number of heretical beliefs about the nature of programming and computing: among the most important was the belief that it was OK to spend large amounts of computer time and resources on improving the ease with which people could program and use computer systems. The Smalltalk research largely ignored issues of machine efficiency, long before this became fashionable.

By 1980, the name Smalltalk was somewhat misleading. Smalltalk-80 is a big, powerful system that combines many of the best ideas in computer science in a highly usable and productive environment. When Xerox began demonstrating and publishing information about its research, many people outside Xerox became interested in learning more about Smalltalk.

Until recently, getting your hands on a working Smalltalk system was difficult and expensive. From Xerox's point of view. Smalltalk was a research project and there was no undertaking to make it available as a commercial product. The very nature of Smalltalk as a research project requiring powerful, expensive and esoteric hardware, made it difficult to see what form a commercial product derived from the research would take. unavailability of a usable implementation, plus ·Smalltalk's unusual syntax and terminology, put many programmers off learning any more about the language.

Xerox has licensed the Smalltalk-80 image to a large number of academic institutions, but there are currently only three commercial suppliers of the Xerox

#### **SCREENTEST**

Smalltalk-80 image. Tektronix has a series of high-performance, 680X0based AΙ workstations designed expressly for Smalltalk-80; the starting price is around \$28,000. Softsmarts Inc. a small firm in California, has Smalltalk-80 available for the IBM PC/ AT for \$US995. It requires an AT with 1.5-2Mbytes of memory, a hard disk, plus an Enhanced Graphics Adaptor. Apple Computer has a pre-release, experimental, unsupported version of Smalltalk-80 available for the Macintosh for \$US50 (many of the original PARC researchers, including Alan Kay, now work for Apple). In August this year, Xerox announced a spin-off company named Parcplace Systems, which will be commercially marketing Smalltalk-80 on behalf of Xerox.

In December 1984, a small Los Angeles-based company named Digitalk introduced its own version of Smalltalk, named Methods, for the ubiquitous IBM PC and compatibles. For a mere potential Smalltalk \$US249. programmers could see what all the fuss was about. Method's syntax was compatible with Smalltalk-80, but the language itself was a subset and ran in a character-based environment that was greatly inferior to that of Smalltalk-80. Now Digitalk has introduced Smalltalk/ V, which is Method's version but with bit-mapped graphics, numerous improvements and extensions, and a price reduction - Smalltalk/V costs \$US99.

This is a complete Smalltalk; not a cut-down or toy version of the language, but a thoroughly professional product capable of serious work. There are some limitations and restrictions compared to Xerox Smalltalk-80, but in compensation, Smalltalk/V is much better

orientated towards use on MS-DOS-based personal computers and is considerably faster. On an IBM AT, it out-Benchmarks Smalltalk-80.

Smalltalk/V runs on an IBM PC, XT, AT or compatible with a minimum of 512k of memory, a Microsoft or compatible mouse, a graphics adaptor (as a minimum, the IBM colour graphics adaptor, but the Enhanced Graphics Adaptor or a Hercules card gives better results), twin disk drives (but a hard disk is much better), and an 8087/80287 co-processor if you plan on using floating point arithmetic.

Although performance is just about tolerable on a standard PC, it's much more satisfactory on an AT, a PC with a turbo card, or a fast clone. If you have an Enhanced Graphics Adaptor, Smalltalk/V supports the 640x350 high-resolution mode, giving some sorely-needed additional screen space. (If you are using a mouse with the EGA, check the mouse driver. It must support the new EGA screen modes).

Smalltalk is adept at handling 'sloppy problems' — many interesting problems in personal computing fall into this category. Almost any program that has to communicate with human beings has to go through numerous revisions before the user interface 'feels right'. Problems that are not clearly understood, problems with no clear solution or a variety of possible solutions, are also good candidates.

Smalltalk supports exploratory programming. Working within the integrated environment, you can build and test programs piece by piece. Long before the entire program is working, you can experiment, evaluate alternative approaches, and exercise your code.

Making changes is fast and easy. Best

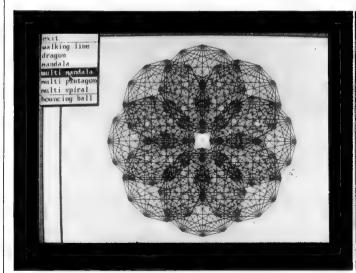
of all, programming in Smalltalk is great fun.

#### The language

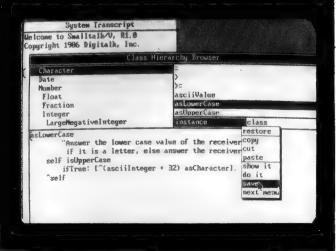
Smalltalk is a uniformly object-orientated language. Every component of the system is represented as an object. A Smalltalk program is a collection of objects that communicate by sending and receiving messages. Each object can store some data and has a set of methods (equivalent to the procedures, subroutines or functions of conventional languages) which define the messages it can understand. Similar objects are grouped into classes. All the objects belonging to a particular class share the same structure and set of methods. The Smalltalk classes are organised into a tree structure. At the root of the tree is class 'Object', which defines the default structure and behaviour of all objects. All the other classes are subclasses of Object. A subclass inherits its structure and the methods it understands from the parent or superclass, but can alter the structure, and add, delete or change the set of methods an object (called an instance) of its class will understand. Fig. 1 illustrates the Smalltalk/V class hierarchy (subclasses are indented).

As Fig 1 shows, everything in Smalltalk is represented as an object, from the low-level components such as integers, floating-point numbers, dates, times, strings or arrays, through to highlevel components such as text editors, window panes, compilers or applications programs. Even the internal state of an executing method (roughly equivalent to the stack activation record of languages such as C or Pascal) is represented as an object called a *context*.

Like Forth, Smalltalk is an interactive,



Logo-style turtle graphics are supported, and simple, animated images can be manipulated



Smalltalk differs from the Mac in that the menus pop up at the cursor position, rather than from a menu bar



STILL THE BEST
SERVICE WITH THE
SERVICE WITH THE
BIGGEST SAVINGS!
Call (03) 417 7044 MORE SERVICE
Call (03) 417 7044 MORE SERVICE

OVERSTOCKED ON PRINTERS

#### \*FREE CABLE inc.

ruii man	uracturers warranty, top branus.	
Epson	- FX105 (industry leader)	845
	- LQ1000 (letter quality)	1185
	- LQ800 (letter quality	945
	- EX1000 (new Release 300 cps)	1095
	- EX800 (300 cps & opt colour)	829
	- LX86 (top seller)	415
	** 12 months warranty **	
Star	- SG15 (best value 132 col)	575
	- SD15 (FX100 features)	695
	- SD10 (FX85 complete)	559
Toshiba	- P351 (high performance)	1795
	- P341e	1395
C-Itoh	- For real bargains	Call
Brother	<ul> <li>M1509 (180 cps, FX100 compatible)</li> </ul>	795
Roland	- DXY980 8 pen CAD plotter	1995
	4.0	

## HARDYASHED

Hardcard	- PC + 10Mb (high performance)	148
	- PC + 10Mb	98
Tape Storage	- Inter Dyne 20Mb (Top US seller)	79
	<ul> <li>Inter Dyne 20Mb - External</li> </ul>	119
Hard Disks	- Rodime 40Mb	165
	- Seagate 20Mb	92
Boards	- Intel Above Board	49
	- AST 6 pack	28
	- STB EGA	54
	- Memory Expansion	12
Modems	- 1234A (internal)	117
	- In-Modem	39
	- 3 + 12 External	26.
Chips	- 8087	23
·	- 64K (each)	2.5
	- 256K (each)	
Supplies	- Nashua Bulk Pack DSDD (100)	17

#### **Monitor Madness**

	-		_	-	_	_	Ξ		_	_	_
- Colour											435
- Hi-Res Green											175
- Composite											145

#### **SOFTWARE SAVINGS**

	THE CALLETON
Spreadsheets	- Lotus 1-2-3 5
	- Javelin
	- Supercalc 4 5
	- Multiplan
Wordprocessing	- Wordperfect 5
, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	- MS Word 59
	- Wordstar 2000 + 49
	- Multimate Advantage 69
Database	- dBase III Plus 83
	- Paradox 79
	- R Base 5000
	- Reflex
Integrated	- Framework 9
	- Open Access II
	- Symphony 89
	- First Choice 2
Utilities	- Copywrite
	- Norton Utilities 1:
	- PC Alien
	- Windows
	- X-Tree
	- Mace 1
Training	- PC Tutorial
	- Typequick
Project	- Timeline
,	- MS Project
	- Superproject Plus 5
Communications	- Crosstalk
Accounting	- Business Manager 59
Publishing	- Personal Publisher 20
Graphics	- Harvard Graphics 4
	- MS Chart
OTHER	- CALL CALL CALL CALL CALL



#### AUSTRALIAN TOP 10

		Our
	RRP	
1. Lotus 1-2-3	930	575
2. dBASE III Plus	1300	830
3. MS-Word (Version 3)	845	599
4. Open Access II	1115	750
5. Wordstar	500	325
6. Displaywrite 3	825	Call
7. Wordperfect	776	519
8. Multimate Advantage	1084	695
9. Multiplan	440	320
10. Dataflex	1180	Call

## MICR@SOFT.

IBM	- Multiplan
	- MS Word (Version 3)
	- MS Word with Mouse
	- MS Project
	- MS Windows
	- MS Chart
	- MS Access
Macintosh	- Excel
	- Multiplan
	- Word
Languages	- Quickbasic
	- C-Compiler
	- Pascal
	- Macro Assembler
	- Cobol Fortran
	- Mouse (Bus or Serial)
**Note all S	oftware is current version



#### **BORLAND**

Turbo Pascal	95
Database toolbox	89
Graphics toolbox	89
Editor toolbox	89
Tutor	49
Gameworks	59
Turbo Lighting	119
Superkey	99
Sidekick (non copy protected)	89
Turbo Prolog	125
Peffey	100

3 Months FREE hotline support with all purchases.

## **BARGAINS**

#### **Alternative Packages**

	_	
Integrated	- First Choice	225
Spreadsheets	- VP Planner	149
	- Twin (Lotus Clone)	149
Wordprocessor	- PFS Write	159
•	- Ready (Outline processor)	49
Database	- Reflex	199
	- VP Info	175
Languages	· MS Quickbasic	165
Operating Sys	- MS-Dos & GW Basic	195
Comms	- Mirror (Crosstalk clone)	85

# SYSTEMS — Top Value (Ask about our Trade in Offer)

1. Epsor PC HD	- 20Mb disc. Hi-Res Mono.	,
	12 mths warranty	3445
2. Epson PC +	- 20Mb disc, high performance,	
	PC of the year award	4450
3. Olivetti M24	<ul> <li>-20Mb disc, 8 Mhz performance,</li> </ul>	
	Hi-Res monitor	4495
4.Tandon AT	<ul> <li>20Mb Voice Call, Hi-Res Mono,</li> </ul>	
	12 Months warranty	5995
<ol><li>XT Compatible</li></ol>	<ul> <li>Ideal for home use. Mono screen</li> </ul>	
	dual floppy	1545
6. IBM XT	- The real thing, 20Mb, Hi-Res Mono	
	640K (everything)	4995
Extras: D	los 2.1 — \$95, Colour Monitor plus \$425	
	Pre-delivery & testing — \$50	

First choice integrated package with word processor, database, comms and spread sheet.

\$150 with each system RRP \$495.

# SPECIAL OFFER:

Software:	Homebase (better than sidekick)	115
	Twin	149
	Access Four	350
	Macintosh Word or Multiplan	250
	Harvard Presentation Graphics	499
Hardware:	Composite Monitors-Zenith	145
	AST Rampage (next generation board)	490
	C-Itoh printers	Call

#### AT COST or LESS

Software:	Apple games	
Hardware:	CPA +AST Preview (includes Flight	499
Hardware.	Simulator)	199

#### **CHECK OUR LIST OF TOP SERVICES**

3 Months free HOTLINE SUPPORT on all hardware and software purchases



3 12 MONTHS FREE 4P membership with order over \$600.

4. All products fully supported by Official Australian Distributor are backed by our own guarantee.

#### NOTE:

- 1. Delivery and Insurance **only** \$7.50 (on all software, boards and accessories)
- 2. Bankcard and Visa Cards Accepted
- 3. Call for products not listed
- 4. All prices EXCLUDE tax (add 14% tax.)
- 5. Prices are correct at time of printing but may alter without notice.



# Our software makes your software smarter.





SmartKey does one thing. It lets you take any long, boring, repetitive or difficult-to-remember set of keystrokes and assign them to a single key. Sophisticated programs like Symphony give you a "macro" facility. SmartKey gives you macros for all your software in a single easy-to-use package. Any word, any line, any paragraph — even a whole page of "boilerplate" can be allocated to a single key and permanently saved. The uses of SmartKey are limited only by the imagination.

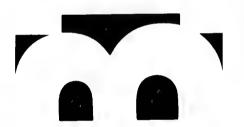
Available for IBM and compatibles (SmartKey 5.1), MS-DOS and CP/M-86 (SmartKey II Plus), CP/M-80 (SmartKey II). **Price:** \$81°.





An easy to use program that lets you read, write, and format disks from different CP/M and MSDOS machines! Speak to more than 220 other computers.

If the disk format you need to access is not included in the current menus in PC-Alien, just send us your formatted CP/M or MSDOS diskette containing more than 50% readable ASCII text and we will try to add that format to PC-Alien's comprehensive list. With the appropriate hardware, PC-Alien will allow you to read 3.5 inch, 80 track and 8 inch formats in CP/M-80, 86 and MSDOS. Available for IBM and compatibles. **Price:** \$104°.





A collection of "pop up" desk tools which you can tailor to your needs: A full featured resident screen editor/notepad; A programmable calculator; A sophisticated financial calculator, A calendar alarm clock: A telephone dialer: A DOS menu which lets you use common DOS commands Also includes a program which lets you interrupt an application, run any other program and then return to the application just where you left off.

Available for IBM and compatibles. Price: \$104\*.



SPATH

A terrific hard disk space saver which eliminates the need for multiple copies of overlay and other program files on disk. Run any program that uses overlays, help, or other auxiliary files from any directory, sub-directory or disk drive Group documents or data files into separate directories and subdirectories without keeping copies of your software on each one SPATH is easy to use and once installed it may be autoloaded and forgotten.

Available for IBM and compatibles, other MS-DOS. **Price: \$33**°.



Don't throw away your old favourite CP/M-80 software! Now you can run it at full speed on your IBM-PC or compatible. By simply exchanging the 8088 CPU chip in your machine with the latest state-of-the-art NEC V20 chip you retain 100% compatibility with other hardware and software.

The V-20 also runs 8080 (not 7-80) code at full speed. With our PC-

The V-20 also runs 8080 (not Z-80) code at full speed. With our PC-Eighty software, you can run your copy of CP/M version 2.2 as a task under DOS. With hard disk access, a half megabyte RAM disk and simultaneous use of DOS resident programs like SmartKey.

Available for IBM and compatibles. Price: \$140°.



Dealer inquiries welcome \*Allow \$5.00 additional postage charges



#### FOR FURTHER INFORMATION:

Please send this coupon to FBN Software 16 Coles Place TORRENS ACT 2607 or call (062) 86 1 102

NAME	

ADDRESS \_\_\_\_\_\_\_ P/CODE \_\_\_

AUSTRALIAN SYSTEMS SOFTWARE

extensible language: almost all of Smalltalk is written in Smalltalk. At the centre of the system is a set of primitive methods, implemented in assembly language. Smalltalk/V comes with around 120 classes and 2000 methods. The entire Smalltalk source code for all classes (except the compiler class and primitive methods) is supplied. The source code is online and available at all times in the programming environment.

Programming in Smalltalk consists of defining and redefining classes and subclasses, and specifying their structure and behaviour. A tremendous amount of functionality is already built into the system.

Objects can be visualised as specialist, little, abstract computers. Objects, like computers, are a package that have some structure - private data (or memory), plus they understand how to perform a set of operations upon the data. To ask an object to perform a particular operation, you send it a message requesting it to carry out that operation. ('Message' has become overloaded in computing - Smalltalk messages have nothing to do with networks or concurrency). An object's memory or data is private and cannot be accessed from outside. It can only be accessed by sending a message to the object, which invokes a method that acts upon that data. The only way an executing method can gain access to other objects is to send messages to them as part of its actions. Program flow can be viewed as a conversation between communicating computers.

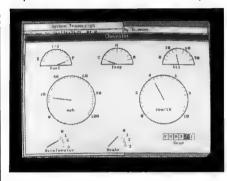
Note that sending a message to an object specifies what should be done, but not how it should be done. The methods in an object are free to choose how to respond to the message. An object is a black box; all a programmer needs to know about is the set of messages it responds to and the actions they perform — its message interface. If objects of different classes respond to the same messages, the code in a method will work OK with these different classes. As a consequence of this type of independence, it's easy to write code that handles a variety of different data types, and will continue to work even with new classes defined long after the original code has been written.

Object orientation provides a higherlevel structuring mechanism than the operator/operand model of conventional programaming languages such as C, Pascal or Modula-2. The closest analogy is probably with the implementation of abstract data types in languages such as Modula, Ada or an extended Pascal, but there are important differences.



Smalltalk uses 'run-time' or 'late' binding. In early bound languages such as Pascal, if you call a print procedure with a floating-point number, the compiler checks that the print procedure expects a floating-point number and complains if it's of a different type.

In Smalltalk, sending a message is a polymorphic (independent of type) procedure or function call. Ask an object to print itself, and it looks for the print



Demonstration programs include a Chevrolet dashboard simulation

method among its methods. If it can't find the print method, it looks in its superclass methods and if it isn't found there, backs right up the tree, ultimately to class Object looking for a print method. If it can't find out how to print, an 'Object does not understand: messageName' error results. (Apart from division by 0 and I/O errors, this is one of the few run-time errors that occurs in Smalltalk programs). The crucial difference is that the decision as to which procedure or function is called is made at run-time in Smalltalk, and at compile time in Pascal or C.

Object orientation divides programs up into highly modular systems. Provided the message interface remains the same, you can make any changes to an object that you like — secure in the knowledge that you can't do any damage. Large programs are built upon the same principles as small programs, and you can make changes to very complex programs without having to comprehend how everything works.

# The programming environment

Programming in the Smalltalk environment is quite different to conventional

programming of a personal computer. Load-up Smalltalk/V, and the humble PC is transformed into a system resembling a Sun or Symbolics workstation.

The Smalltalk environment is stored on disk in the form of a snapshot of a running system. This image reflects the system exactly as it was saved. When you come to exit Smalltalk at the end of a programming session, you have the option of saving the image to disk. Restarting Smalltalk loads the image back exactly as it was when you quit. If required, multiple images can be maintained in different subdirectories on disk.

While there are detail differences, the screen appearance will be familiar to anyone who has used an Apple Macintosh. Multiple overlapping windows appear on the display. Text can be cut and pasted between the different windows by highlighting it with a mouse and selecting 'cut' or 'paste' from the menu. (Smalltalk differs from the Macintosh in that menus pop up at the current cursor position rather than pull down from a menu bar at the top of the screen). Unlike Smalltalk-80, which really requires a three-button mouse, Smalltalk/V uses the two-button Microsoft mouse or a compatible.

The Smalltalk environment is probably closest to that of Lisp, Logo or Forth. Smalltalk is incrementally compiled into bytecodes for a virtual machine (in a similar manner to the UCSD Pascal system). Enter some Smalltalk code in a window, highlight it with the mouse, select 'Do It' from the pop-up menu and the code is compiled and executed. If there are problems in compiling the text. an explanatory message is inserted at the location of the problem. If everything has compiled OK but there's a run-time error, a walk-back window pops up in the middle of the screen, showing a backtrace of message sends. A separate debugger window, or a special window called an 'inspector', can be used to examine the state of the halted program.

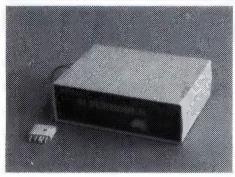
Defining or redefining classes and subclasses is normally done using a browser window. A class browser displays one class in a multi-paned window and lets you change the structure, or add, delete or change a method. When your changes are complete, selecting 'Save' from the popup menu recompiles the class or method(s). A variant of the class browser, the class hierarchy browser, shows you the big picture with a list of classes in the first pane, method names in the second, and the actual source of methods at the bottom. All the changes you make are stored in a disk file called

# 1200/75 BAUD SMART MODEM: \$395 A revolutionary, new, Australian-made modem for IBM, Apple //c, etc.

"1200/75, 300 Baud full duplex, Havescompatible, auto-answer, auto-dial, autodisconnect, auto-Baud rate select, auto-line turnaround, fully software controlled, VIATEL, RS232 connection, optional V.22 1200 Baud full duplex, mains powered, microprocessor controlled. intelligent standalone modem for IBM, Apple IIc, Macintosh, MicroBee and any computer with a serial port for under \$400....."

That was my shopping list when I went looking for a modem for my IBM. I needed a standalone modem that I could leave connected to the phone logging data while the IBM was disconnected, and that could be connected to a variety of other computers. And I didn't want to pay over \$1000.

#### A fully-featured RS232 modem for under \$400.



GPA Supermodem connects to phone and serial port And, of course, by now you'll know that we built thousands and they have taken Australia by storm. Telecom, Westpac, CSIRO, UNSW are some of our larger customers. Their responses have been universally enthusiastic: "Fantastic! How did you do it for the price?" or "We want more of them. When will you have more stocks?" Some of our customers have bought up to 10 modems at a time!

For the first 3 months of production demand exceeded supply, but we have caught up now and SuperModems are now available ex stock. We have cables to suit most micros and can advise on the most suitable software for your computer. Viatel software is now available for the IBM and Apple IIe, IIc. Terminapple comms software to suit also available.

#### **IN STOCK NOW**

#### TECHNICAL FEATURES

- \* Standalone, direct-connect serial modem
- \* 6809 microprocessor controlled
- \* Auto-answer, auto-dial, autodisconnect, auto-line-turnaround
- \* CCITT V21 and V23
- \* V22 option, 1200 baud full dup available soon for \$160.
- \* VIATEL software available \$25 (Apple/IBM)
- \* Plugs into any serial port
- \* Automatic Baud rate selection
- Mains powered & onboard speaker
- \* Meets Telecom approval specs
- \* Fully software controllable
- \* Internal expansion slot
- \* Computer cables (specify) \$30



GPA Supermodem: Note V22 expansion socket

#### " That's all very well, but what do I DO with a modem?"

- \* WORK FROM HOME:- Interrogate your office computer. Send and receive messages, text for typesetting, price list l updates, contracts, advertising drafts etc. I Interrogate databases worldwide, e.g., MIDAS, DIALOG, LEXIS, MEDLINE
- \* RECREATION:- VIATEL, BULLETIN BOARDS, USER GROUPS, etc.
- \* VIATEL:- Electonic mail, Instant telex at a fraction of the cost. Instant price updates as they occur on the stockmarket. Buy & sell. Home banking. Instant gambling on any race in Australia through VIATAB. Shop from home. Airline and hotel bookings. Home education courses.

possibilities are limitless exponentially expanding. The modem adds a third dimension to your computer that opens up as you explore it. You have to experience for yourself the magic of clicking between Sydney, Los Angeles, New York, Mexico City by modem.

Instantly, transparently and cheaply. Culling obscure facts. Interrogating Buying. mighty databases. Selling. Dazzling.

10 DAY FREE TRIAL

This really is a brilliant modem, but the only way you will ever find out for vourself is to order one. But you don't have to take my word for it. You can order a gpa SuperModem, try it out, and if it doesn't live up to your expectations send it back within a fortnight for a FULL REFUND. NO QUESTIONS ASKED. I could go on but the answer is to try it for yourself. We showed this ad to some of our best customers and they were sceptical that a \$395 modem could do everything we claimed. But when we loaned them a gpa SuperModem they were ECSTATIC. It really is that good.

TO ORDER: Ring me now on (049)26 4122 and quote your credit card number for overnight delivery. Or mail your cheque, purchase order or credit card number on the enclosed order form. Mail to Micro-Educational Pty Ltd, 8/235 Darby St NEWCASTLE 2300

#### ORDER FORM

MICRO-EDUCATIONAL 8/235 Darby St NEWCASTLE 2300

Dear George,	ease rush me
	m/s @ \$359 ex/ \$395 inc
	appleIIc/Amiga/Mac/Bee
	on 10
day approval. If I	am not delighted with it
I will send it back	within a fortnight for a
FULL REFUND.	Other extras as follows:
Cable \$30	Viatel s/w \$25
NAME:	
ADDRESS:	
P/CODE:	
Enclosed please fi	ind cheque/ purchase
order/ Bankcard/	VISA/ Mastercard

Add \$7 per modem for insured overnight KWIKASAIR courier.

# MICRO-EDUCATIONAL PTY LTD 8/235 DARBY ST NEWCASTLE 2300 Ph (049) 26 4122

Australia's Largest Computer Mail-Order Company

# BUY DIRECT... WITH CONFIDENCE

#### We offer:

- \* 8 years experience
- \* Overnight delivery
- \* 10 day money-back warranty 6 months full service warranty
- Top quality national brand products
- Competitive prices
- **Excellent workshop service**
- Friendly phone advice
- \* Phone, VIATEL and mail ordering
- AND we treat you like family!

#### TOP SELLERS

3.5" **DISKS** SS/DSDD \$5





IBM JOYSTICK \$50 SWS 60 DISK BOX \$25 YA-40L 3.5" DISK BOX \$25

# **DISKS \$1.50**

(\$1.40 IN 100'S)



That's a fantastic price for lifetime warranty, Micro-Ed logo, SSDD disks. These are premium quality, machine-manufactured diskettes. Made in the US by Wabash DataTech. Suit Apple, Commodore, Microbee etc. Will also suit IBM as they can be used double-sided. You can spend up to \$8 each for premium quality diskettes. Ours cost \$1.50 because we sell A MILLION DISKS A YEAR! When you shift disks in truckload quantities you get real economies of scale. Check around. Even the chain stores are dearer than us on lifetime warranty diskettes.

We won't be beaten on price for quality disks!

#### GPA SUPERMODEM \$395



Our top-selling modem. Features:

Auto-answer, auto-dial, auto-disconnect, auto-line-turnaround, Hayes compatible, 300Bd Full-duplex, 1200/75 Viatel mode, 1200Bd full-duplex optional extra (\$160 extra). Over 1100 sold! \$395 (Cables \$30 and IBM/Apple Viatel software \$25 extra.) Also available as a Kit for \$299!

## FREE

- Apple/IBM Library Disk(orders >\$50)
- Micro-Educational pen
- \* Newsletter/ Catalog
- \* PLUS you can ...



a \$2200 PC system. FREE entry in draw with all orders. Drawn Dec 19.

#### ORDER FORM

To: PO 160 THE JUNCTION 2291

Dear George,

Please rush me the following:\_\_\_

and enter my name in the PC DRAW. Enclosed please find cheque/ purchase order/money order/Bankcard/VISA/MasterCard

for \$\_\_\_\_ (add \$7 courier)

NAME:\_\_\_

ADDRESS:

COMPUTER:\_\_\_\_\_SIGNED:\_\_\_

#### SCREENTEST

the 'change log', which stores updated and new source code. If your changes crash the system, most of your work can be recovered without loss by reading-in the change log.

#### Extending the system

As all work is carried out in the one environment, it's easy to extend and build new tools to aid your programming. There's no distinction between system code and applications code. Both the source code and the compiled form of programs are accessible as objects, as is the representation of program state and that of the system itself.

The end result is that Smalltalk is tremendously malleable and flexible: it's easy to customise the system to suit your tastes and applications. Expanding the language or environment is easy. The general philosophy is expressed succintly as: 'If you don't like it, you can change it.'

Smalltalk/V comes with bit and form editors which let you create and edit bitmap pictures in a similar way to the Apple MacPaint program on the Macintosh ('form' is Smalltalkese for bitmap). Logo-style turtle graphics are supported with a Pen class, and simple, animated images can be manipulated using a subclass of Pen named Animation.

Smalltalk/V's disk browser window provides much of the functionality of the DOS command interpreter COMMAND.-COM in a visual manner. In a similar manner to the class hierarchy browser, you can browse the DOS directory tree structure, select and edit files, delete, rename or print files, file-in and compile Smalltalk source code, and so on.

Demonstration programs supplied include some simple graphics demona graphical Chevrolet strations. dashboard simulation, and an extension to the disk browser that draws a graphical tree of the DOS directory structure, allowing you to scroll around with the mouse. Smalltalk/V comes with an embedded implementation of Prolog that lets you mix rule-based declarative programming with Smalltalk-style, object-orientated programming. As with everything else, the source to Prolog/V and the demonstration programs is supplied on disk.

Smalltalk/V lets you define your own primitive methods in assembly language via the MS-DOS terminate-and-stay-resident facility. With a little work, you can call C or Pascal functions. Using a simple word-swap capability, you can exit to DOS and execute DOS programs from within Smalltalk.

If you come up against the dreaded

640k memory limit of current PCs, Smalltalk/V supports a simple form of virtual memory management. When an allocation request fails, objects are automatically swapped out to disk. Window images are normally cached in a form to allow fast screen redraw, but a

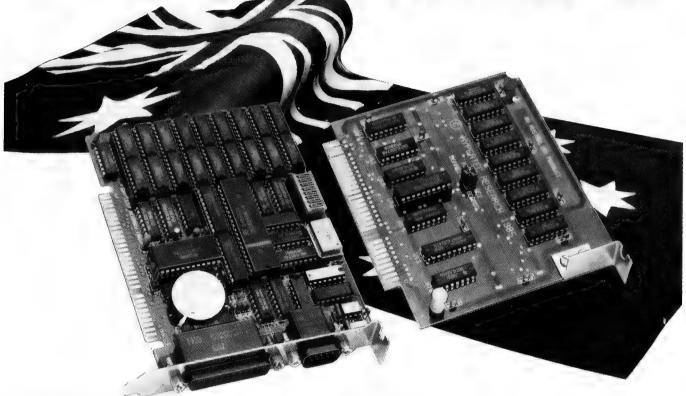
toggle lets you trade space for speed if you're running large applications, redrawing the image when necessary.

Smalltalk/V's documentation consists of a 500-page manual, perfect-bound, in the format pioneered by Borland with Turbo Pascal. It is divided up into three

```
Object
                                     ScreenDespatcher
 Behaviour
                                     ScrollDespatcher
  Class
                                      FormEditor
  MetaClass
                                      ListSelector
 RitRIt
                                      TextEditor
  CharacterScanner
                                       PromptEditor
  Pen
                                     TopDespatcher
   Animation
                                    DespatchManager
                                    DisplayObject
   Commander
   FreeDrawing
                                     DisplayMedium
 BitEditor
                                      Form
 Boolean
                                       DisplayScreen
  False
                                       SelectorForm
  True
                                    File
 ClassBrowser
                                    Font
 ClassHierarchyBrowser
                                    Inspector
 ClassReader
                                     Debugger
 Collection
                                     DictionaryInspector
  Bag
                                    Magnitude
  IndexedCollection
                                     Association
   FixedSizeCollection
                                     Character
    Array
                                     Date
    Bit-map
                                     Number
    ByteArray
                                      Float
     CompiledMethod
                                      Fraction
     FileControlBlock
                                      Integer
    Interval
                                        LargeNegativeInteger
                                        LargePositiveInteger
    String
     Symbol
                                        SmallInteger
   OrderedCollection
                                     Time
    Process
                                    Menu
    SortedCollection
                                    Message
  Set
                                    Pane
   Dictionary
                                     SubPane
    IdentityDictionary
                                       GraphPane
     MethodDictionary
                                        FreeDrawPane
    SystemDictionary
                                       ListPane
   SymbolSet
                                       TextPane
 Compiler
                                     TopPane
  LCompiler
                                    Pattern
 Context
                                      WildPattern
 ControlApparatus
                                     Point
  Scale
                                     Prompter
   Dial
                                     Rectangle
  Switch
                                     Stream
   Button
                                      ReadStream
 ControlPanel
                                      WriteStream
  Dashboard
                                       PrinterStream
 CursorManager
                                       ReadWriteStream
  NoMouseCursor
                                        FileStream
 DemoClass
                                        TerminalStream
 Directory
                                     StringModel
 DiskBrowser
                                     TextSelection
 Despatcher
                                     UndefinedObject
  GraphDespatcher
                                    SwappedOutObject
  PointDespatcher
```

Fig 1 Smalltalk/V class hierarchy

**EXTRA MEMORY EXTRA-ORDINARY PRICES!** 



Hypertec is proud to offer its range of memory expansion and multifunction boards for IBM PCs and true compatibles. Prices start from as little as \$195.

#### THIS IS OUR REPUTATION

- These boards are designed to substantially increase the power, flexibility and range of uses of IBM PCs and true compatibles. They stretch your invested dollar a lot further.
- At last, a range of <u>Australian</u> designed and built boards not
- Being Australian products means that <u>local support</u> is available to both dealers and users - from the company which designed and built the boards.
- Highest quality backed by full 12 months warranty from Hypertec.
- All this available at outstanding prices.

#### HYPER-256 MF:

A short multifunction board with 256 KB, serial and parallel ports plus clock (PC/XT).

#### HYPER-512 MF:

A short multifunction board with 512 KB, serial and parallel ports plus clock (PC/XT).

#### HYPER-PORT:

A short board with serial and parallel ports plus clock (PC/XT/AT).

#### HYPERAM:

A long board with up to 1.75 MB of expanded memory, 2 serial ports and clock (PC/XT).

#### HYPER-128AT:

128 KB memory board for the AT.

#### HYPER-384 AT:

384 KB memory board for the AT.

#### HYPER-256:

A short 256 KB memory board (PC/XT).

#### **HYPER-512:**

A short 512 KB memory board (PC/XT).

All boards come with full manual plus simple step-by-step procedures in plain English to make installation a breeze. Dealer enquiries are welcome.





Hypertec Pty. Ltd. Suite 404, Henry Lawson Business Centre Birkenhead Point, Drummoyne, N.S.W. 2047 Telephone: (02) 819 7222. Telex: 177440

	D. Box 385, Drummoyne, N.S.W. 2047. nation on the boards indicated and details  HYPER-PORT HYPERAM HYPER-128 AT HYPER-384 AT
NAME:	
POSITION:	
COMPANY:	
ADDRESS:	
	PHONE:
	OACE/ED/LIN

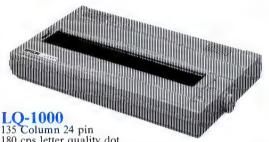
2465/FP/Little

# EPSON No 1

IN PRINTERS!

DATA PARTS NO 1 IN PRINTER PRICES!

## TG-1000



180 cps letter quality dot matrix impact printer with word processing capability and inbuilt serial and parallel interfaces.

LQ-800

80 Column 24 pin 180 cps letter quality dot matrix impact printer with word processing capability and inbuilt serial and parallel interfaces.



**GX-80** 

80 column 9 pin 100 cps dot matrix impact with NEAR LETTER QUALITY. Select the compatible interface (Plugs in back of printer) of your choice

- Commodore
- IBM
- Parallel (BBC, Microbee, Amstrad, Apple IIe etc)
- Apple 2C

#### **MAIL ORDER NOW!**

Call direct! Call today! Shepparton (058) 21 7155

# **DataParts**

The best computer people in the country.



**FX-105** 

dot matrix impact printer with word processing capability and IBM compatibility.

**FX-85** 

80 Column 160 cps NLQ dot matrix printer with word processing capability and IBM compatibility.

## EX-1000

#### EX-1000 SUPER FAST

136 Column 9 pin 300 cps letter quality dot

matrix printer with colour option kit word processing capability and inbuilt serial and parallel

interfaces.

#### **EX-800 SUPER FAST**

80 column 9 pin 300 cps letter quality dot matrix impact printer with colour option kit word processing capability and inbuilt serial and parallel interfaces.



## SPECIAL OFFER WITH EACH PRINTER...

1 x Box of Bond Paper

1 x Printer cable of your choice

2 x Spare Ribbons

CAMBERWELL: 519 Burke Road BENDIGO: 419 Hargreaves Street SHEPPARTON: 11 Edward Street ALBURY (Dataland): 519 Macauley Street (060) 21 8088

or Authorised Agents

WOLUNDRY COMPUTERS: Wagga

(069) 21 6466

\* Advertised prices must be quoted

\* Prices and products subject to change without notice

FREE DELIVERY ANYWHERE IN AUSTRALIA

# SIMPLY THE BEST DEALS

#### We guarantee to beat any price by \$10

Tell us the advertiser and price of any software or hardware item on this page currently advertised in any popular computer publication and we'll beat that price by \$10.

This offer does not apply to items under \$100 or where the price is not lower than DataParts.

BEAT THE \$ PRICE RISE

#### **EPSON** COMPUTERS

See the latest in micros at Australia's best prices



#### PHILIPS TELEVISION HIGH QUALITY TV MONITOR

RGB/14" Composite \* 40 col \* 80 col Ideal for BBC, IBM APPLE COMMODORE MICRO BEE Includes cable to suit PLUS BUILT IN ANTENNA \$580,inc

> We will not be beaten on Taxan prices



#### TAXAN SUPER IV

Super hi resolution graphics display for CAD and CAM

Special \$P.O.A. on all models

#### "PC TYPE" HARD DISKS

Seagate 20 MB hard disk drives, Include controller and cable. Ready to fit kit. \$960 (inc.)

12 months warranty.

#### POWER SUPPLIES IBM-IBM-IBM

High precision in steel case with built in fan. \$199 inc



APPLE-APPLE POWER SUPPLIES \$99 inc

#### PRINTER BARGAINS

OLYMPIC NLQ PRINTER

tronic, touch button, high nance, dot matrix with single sheet or continuous feed. 165 cps (90 cps NLQ) bi-directional. Epson and Centronic compatible with optional 2K buffer.

\$549 (inc) Save \$300 Prod. No A107



#### **BUY ONE GET ONE FREE**

DATALAND DSDD DISKS

Best quality Australian made plastic library boxes of 10

\$39.50 per box (pay only \$39.50 for two boxes delivered to your door!)

#### APPLE SUPER FANS - NEW RELEASE

Plugs directly to side of Apple II, IIE and compatible. Save on costly repairs.

#### XETEC/COMMODORE

Interface Unit Make any printer compatible with your 64 or 128 computer

\$99 (inc) Save \$22 Prod No A110

#### TAXAN SUPER PRINTER

BUFFER

The super buffer that never forgets it comes standard with 64K memory and is expandable to 256K. Multi dual printer function switch. Copy, pause and reset functions. INCREDIBLE VALUE—Until stocks run out!

\$399 (inc) Save \$170



# DATALAND

IBM PC COMPATIBLE

640K, Dual drives
Dual speed up to 8
MHz. All cards, all wanted

\$1490

#### ACORN "Add ons"

Phus 3 Acorn Software galore from \$9.00 each

APPLE COMPATIBLE New release for 2E EXC INC

CHINON \$199 TEAC 218



- Wordstar \$245
   Lotus 123 → \$522
- dBase II & III from \$550

#### PHONE FOR OUR PRICE ON APPLE COMPATIBLE **PRODUCTS**

#### COMMODORE "AMIGA" SPECIAL INCLUDES Supa Hi-Res Monitor

C128 Only \$599 \$495 Plus cashback offer.

Phone for our unbeatable prices on all Commodore

#### QUALITY DRIVES FOR IBM

High precision • High quality • High durability • You name it. Top range of disk drives ideal for use with TRS 80, Microbee IBM, BBC, etc.

\$169 (inc) Prod. No A116A -DSDD slimline drive-

\$229 (inc) \$249 (inc) Prod No A116C

#### DATALAND

**8000** series

- 640K RAM SAVE \$400
- All cards Includes software
- AT case & KB
- Dum speed 20MG hard disk fitted

\$2498.00

#### BARGAIN **ITEMS**

Disk Drives

\$68 Full height type
\$99 for IBM (all going)
Apple RGB Cards

\$49 (going) \$29 (need work)

- P88 & Amust Printer serial cards
   TEC/C-Itoh tractor kits
- S198

to clear \$19
Commodore Pet products to clear

Atari ST BBC Master BBC Add-ons

#### DEC RAINBOW '100

POA

with Hard disk & Printer + loads of software, POA

#### JOYSTICKS

All our new joysticks are designed around the famous American Kraft joystick.
Prod. No. A121

Commodore\$19each (inc) \$34 each \$39 each \$39 each

#### SAMSUNG **MONITORS**

Full range

Composite T.T.L. (IBM standard)

\$249.00 (inc)

T.T.L. & Comp SPECIALS FOR SEPT ONLY

#### APPLE OR IBM MOUSE

IBM Now only \$149 (inc) Apple Now only \$99 Prod No A123

#### **ACOUSTIC** COUPLER OR

Sendata 300 Baud \$99 (ex) Model, V21

Also see the new 1200/75 VIATEL MODEM from \$299 (inc.) with S/ware.

Phone for best prices on Netcom & Sendata modems

#### HALF PRICE PRINTER

With every purchase of Com-modore AMIGA. Data Parts offer either the new Epson LX86 or GX80 at half our normal discount price

eg. \$499 ror GX80 You pay only \$249.50

#### "APPLE-TYPE" CARDS

- Apple-Type Mouse 600 Pal Colour Cards \$59 Speech Z-80/CP/M Cards \$49
  - \$59 \$89 ICE Parallel Printer ICE Serial Printer \$89 \$58
- Drive Card2E Extended Card

\$99 64K/80col

#### SUPER SPECIAL ON HIGH RESOLUTION COLOUR MONITORS

Phoenix V/IBM quality 560 x 240 pixels composite and RGB Only \$498.00



#### COMPONENTS 100 + RAM 10 +4116 \$1.49 \$1.29 New "AT" chips now in stock 4164/4864 \$2.40 \$2.20 41256 \$8.95 \$6.95 2114 \$1.49 \$1.29 \$2.80 \$2.50 **FPROMS** \$3.90 \$3.50 2732 \$5.90 \$5.00 \$6.50 \$6.20 27128 Prod No

#### **NETWORK CARD 'SPECIAL'**

A128

Famous trans-net card, easy to install. Suits IBM, PC, XT, AT or

\$398 **\$SAVE \$300** 

#### BIG SAVINGS ON NEW. IBM PC XT **COMPUTERS**

33% off the retail price until September 30th System offer includes IBM PC with 256K of memory

- Green screen
  Dual 360K drives
  System software, unit complete

\$3950 save \$1500

#### IBM + STB COMPATIBLE CARDS

- \$299 Multifunctional 364K 512K Memory \$199 inc \$249 inc Cards
- Colorgraphics card Serial/Async comms \$99 inc
- Serial/Async common adaptor 64K ramkits 9x4164 ram Hard disk controller Games adaptor \$29 inc \$199 inc

Prod. No A130 SUPER SPECIAL

SP.O.A.

Mail order now! Call direct! Call today! Shepparton (058) 21 7155

in the country. bankcard

#### Available from these outlets-

CAMBERWELL: 519 Burke Road (03) 20 789 (054) 43 4866 BENDIGO: 419 Harwaves Street (054) 43 4866 SHEPPARTON: 11 Edward Street (058) 21 7155 ALBURY: 518 Macauley Street (Detaland): (060) 21 8084 WOLUNDRY COMPUTERS: Wagge (060) 21 6466

CREDIT CARDS Phone sale **Trade Enquiries Welcome** 

FREE DELIVERY BATAPARTS **ANYWHERE IN AUSTRALIA** CALL NOW AND SAVE! YOU WON'T BEAT OUR QUALITY OR PRICES!

sections: the first 10 chapters are a tutorial introduction to Smalltalk/V; chapters 12 to 14 form a reference guide; and the remainder of the manual documents the class library. The tutorial is very well done. Full source code for each of the tutorial examples is provided on disk, eliminating the monotonous task of typing them in. There is both a conventional (and comprehensive) index, and a method index which shows which classes implement a particular method.



#### Conclusion

Smalltalk/V is a remarkable product. If you are interested in object-orientated programming, programming language design, developing high-quality applica-

tions programs, integrated environments, or simply what programming and using a personal computer should be like, it is highly recommended. At \$US99 (about \$Aust157) it's excellent value for money.

Smalltalk/V comes on three floppy disks. It isn't copy-protected. It's available from Digitalk Inc, 5200 West Century Boulevard, Suite 250, Los Angeles, California 90045, tel: (0011 1) 213 645 1082, for \$US99.95 plus \$US15 airmail carriage.

AT's XT's







... bought in lots of 10 units...

BECOME OUR DEALER

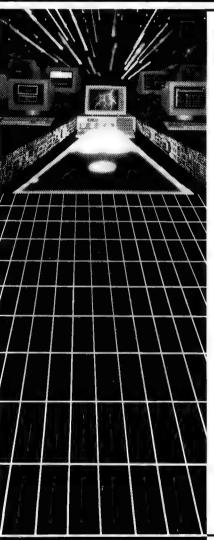
DATRONICS will service OUR compatibles!
We install Network, Moderns and conduct training

#### LOTUS COMPUTERS

CELEBRATES 4 YEARS OF TRADE

(02) 817 4129

Visit our 5000 sg ft warehouse



#### Most People Ask for One Network Solution... We Give Them Two.

Multi-user systems which use inexpensive terminals as workstations, and LANs that require a PC for each user, are incompatible as a rule.

...With the exception of LANLink™ & Multi-Link Advanced™—two networks whose synergy enables terminals, running in a multi-user system under PC-DOS,™ to access disks, programs, files, and peripherals in a software-driven LAN.

Nine Workstations for the Price of an AT.

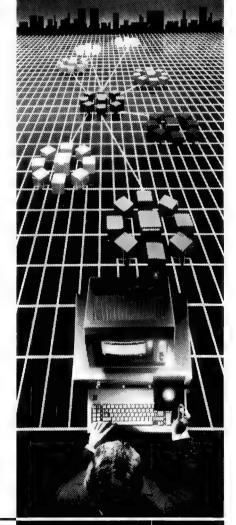
MultiLink Advanced™ transforms ONE PC;™ XT;™ or AT™ into the CPU of a multi-user, multi-tasking system that runs programs which include Lotus;™ WordStar;™ and dBASE™ under PC-DOS.™

Up to eight inexpensive terminals, connected to a single non-dedicated computer with RS-232 ports, emulate ATs having as much as 420K RAM. 100% compatibility with LANLink™ enables terminals to access LAN resources.

99% of PC-DOS Applications Run in a System-Transparent LAN That Uses RS-232 Ports. Instead of old technology network boards, all of LANLink's™ logic resides on the Server and Satellite diskettes.

RS-232 ports and standard PC-DOS commands are used for network communications. A wide variety of software is fully compatible including 1-2-3,™ dBASE,™ and WordStar.™

Choose Your Network Solution Today.





S.P.S. Software Product Support Pty. Ltd.

15 Pacific Highway, Roseville, NSW 2069 PO Box 229, Chatswood, NSW, 2067 Phone (02) 419 5879 or 419 8842



# WHY PAY MORE?

Public Domain and User Supported software for IBM-type computers for A\$8 per disk!

Word processors, data bases, spreadsheets, plenty of games and utilities and much more!

For a free list write:

#### **SHAW**

Box 9573, G.P.O. Hong Kong



#### BARCODE READER

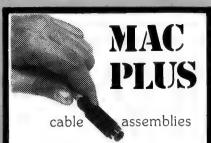
- IBM PC/XT & clones
- Connects between keyboard & PC
- No software drivers needed
- Automatic code distinction
- Australian made
- Includes WAND

\$649 plus ST

ALSO AVAILABLE: RS232 Readers, Readers/Printers, Label printing software \$90, OEM Modules.

#### **ASP MICROCOMPUTERS**

P.O. Box 259, Caulfield East 3145 (03) 500 0628



MADE IN AUSTRALIA

by

#### **KENT DESIGN**

(03) 509 8751

10 Claremont Avenue, Malvern 3144



### TANDY 1000

#### Everything for the 1000!

- COMBI/1000 single slot memory to 640 K, RS232. DMA
- Internal 10 & 20 Meg Hard Drives
- Floppy Drives
- Barcode Reader
- COMPLETE SYSTEMS

Ring for brochure/price list

**ASP MICROCOMPUTERS** 

P.O. Box 259, Caulfield East 3145 (03) 500 0628



#### AMERICAN QUALITY AT TAIWANESE PRICES

Dual Speed TURBO 2 x 360K Drives 640K RAM Multivideo Board Serial & Parallel Outputs Bundled Software Retail \$2,395 incl. ST

**★ RING FOR OUR** GREAT PRICES!

FIFTH GENERATION SYSTEMS PTY. LTD. (03) 29 2600

## PC Clone

SINGLE BOARD COMPUTE



- HALF the size of this page!
- Colour & Mono Output
- Includes Disk Controller
- Legal BIOS, Boots MSDOS
- Printer Port, 2 x RS232 Ports
- PC Keyboard Port
- 256K or 512K RAM
- High Speed Version available

**ONLY \$999** (incl. ST)

#### **ASP MICROCOMPUTERS**

P.O. Box 259, Caulfield East 3145 (03) 500 0628

# M1109 CHOICE'S CHOICE! (September 1986) • 100 cps plus NLQ matrix printer • Super compact • R\$232 & Parallel Interface • P\$50N/RM compatible • APPLE IMAGEWRITER code model optional Retail only \$499 (Incl. ST) BUT RING FOR ASP's PRICE ON THIS AND ALL BROTHER PRODUCTS'

ASP MICROCOMPUTERS (03) 500 0628 P.O. Box 259, Caulfield East 3145

# PORT SWITCH PORT SWITCH PORT SWITCH PRINTER Share a printer. Up to 5 PC's can share one printer. Serial or Parallel. Made in Australia.

KENT DESIGN (03) 509 8751 10 Claremont Avenue, Malvern 3144

### VIDEO TERMINAL \$299!

- Just add an IBM PC compatible keyboard and monitor
- Up to 38,400 baud!
- Emulates various terminals

#### ASP MICROCOMPUTERS

P.O. BOX 259 CAULFIELD EAST 3145 (03) 500 0628

## Hay Hailahell

# introduces NON-OBSOLESCENCE

#### **NEXT YEAR'S TECHNOLOGY?**

That's easy. Replace the existing IBM PC/XT board with an IBM PC AT-compatible board, available now; IBM 32-bit standard, available soon; or whatever the future holds.

#### **MEMORY-HUNGRY SOFTWARE?**

Simply exchange the existing multifunction board (256 K of memory, expandable to 768 K standard) for any configuration of memory, I/O, and controller boards.

#### HIGH-RESOLUTION GRAPHICS?

KAYPRO's standard multivideo board features perfect monochrome clarity plus high-resolution color (IBM CGA). But, if it's IBM EGA that you want? – simply snap in a board.

#### FURTHER SYSTEM EXPANSION?

But of course! The KAYPRO PC is ready for anything. With six available slots, add what you need – networking, modems, more memory – the sky's the limit.



#### PLENTY OF STANDARD FEATURES?

#### **DUAL SPEED:**

Go from 4.77-8 MHz with just a flick of a switch!

#### POWER SUPPLY:

A generous 132 watts of power for even the most demanding hard drive.

#### FLOPPY DISK DRIVES:

Dual IBM-compatible floppy -disk drives standard or slide in the drive of your choice.

#### HARD DRIVE EXPANSION:

Space provided for easy addition of internal hard drives.

#### **BUNDLED SOFTWARE:**

A full selection of business software for today and tomorrow.

#### - KEYBOARD:

Detachable, IBM PC AT-style keyboard with security keylock.

#### Kaypro's new "Snap-In" technology lets you exchange or update all vital system components in seconds.

omputer technology changes with lightning speed. In the time it takes to read this, there will be dozens of new products on the market that make their predecessors obsolete. With that in mind, we'd like to give you a bit of good news. The fully IBM PC/XT compatible KAYPRO PC has been designed to eliminate computer obsolescence. That means it's a snap to update all vital system components – right down to the system's microprocessor.

FOCESSOF.

For more information or the location of your nearest dealer call

(02) 542 3866 TLX: AA176269

CORPORATION

Innovators of Electronic Products for Over 33 Years

And, if it's topnotch features you want, look no further. The KAYPRO PC delivers: IBM PC AT-style key-

board, two disk drives, dual speed board, built-in

33 years of electronics engineering innovation, the American-made KAYPRO PC just may be the

last computer you'll ever need.

color capability, and a 256K RAM (expandable to

768K standard RAM). The culmination of Kaypro's

Price: \$2495 \$3295

\$3295★ (20 meg)

\* suggested retail

★ 20meg does not include a color board.

\*Suggested Retail Price - Tradematiks IBM International Business Machines

## MS-DOS programming

This new series by Ian Davies looks at the MS-DOS operating system from the inside out, and shows how to work 'magic' using MS-DOS internals.

A practical example is included at the end of this instalment.

Mainframes have always had systems programmers, yet the term has never really been applied to the PC world. Perhaps the word 'hacker' has always been used in its place. It's a mystery, as the PC environment allows far more to be done by an adventurous programmer than most mainframes.

This new series will be looking closely at MS-DOS internals, and will show how to write your own MS-DOS drivers, handlers and supervisors. Each month, we will present useful programs which illustrate the various techniques discussed.

Why would anyone want to be able to do all this?

Very simply, if you are a user of other people's products, this knowledge will allow you to interface previously uninterfaceable products, make products behave differently, make them support different devices, make them behave more intelligently, make them run on other machines and generally increase your understanding of what they're doing.

On the other hand, if you're writing your own software, you can use this knowledge to increase performance, improve portability, make it run smarter, interface between languages, and generally work the sort of magic one expects to be worked in a commercially viable product.

The series is not aimed at the average end-user. Neither is it an introduction to programming in assembler. Rather, we assume that our readers are familiar with operating systems and assembly language programming, and focus these arts towards the PC environment. Many of today's PC users have either grown up with machines like the TRS-80, or have

experience under VMS, MVS, VM, Unix or one of the other major mainframe or mini operating systems. Likewise, many have written assembler for other machines or other chips. For these readers, this series will aim their skills towards MS-DOS. For readers who have never before written in assembler, there are many good books available on 8088/8086 assembler, and any one of these would make good reading prior to digesting this series.

This first article in the series will cover a great deal of the basics.

#### The environment

Firstly, what do we class to be an MS-DOS machine?

At the one extreme, the IBM PC (and compatibles) is called an MS-DOS machine. At the other end of the range, machines like the Tandy 1000 and the NGEN running under CTOS are called MS-DOS machines as well.

The first thing to make very clear is that simply running MS-DOS is not enough to provide any degree of compatibility with other machines. MS-DOS is not a sufficently complete operating system to provide facilities for all of the things people want to do with software. For example, its support of the asynch ports is not adequate for reliable communications, its support of the screen is not adequate for most high power software, and the same is true of the printer.

There are three distinct levels involved, each of which will be dealt with in this series. They are:

- MS-DOS level
- Bios level and
- hardware level.

We will be looking at techniques

which involve all three of these levels. However, if you're running one of the 'weird' MS-DOS machines, such as the Tandy 1000, HP-150 or the NGEN under CTOS, then only the MS-DOS level will work. It's useful to know this sort of stuff, particularly as a software author, as it provides insight into portability issues.

All three of the above levels are applicable to the IBM machines and true compatibles, such as the Taiwanese machines, the Tandy 2000, the HP Vectra and the trusty Olivetti M24 — in other words, anything which runs Flight Simulator and Lotus 1-2-3. Looking around the latest PC shows made it clear that just about everyone is coming out with PC compatible machines, except for producers of machines like the Amigas and the Ataris of the world, which are chasing in quite a different direction. While this means that technology has stood still, it also means a boon to the software industry. Suddenly (well, not all that suddenly), the software world has a standard hardware environment in which to work magic.

In the 8-bit CP/M days, it simply wasn't possible to write something like Flight Simulator and have it run on most of the machines in the world. Although CP/M, like MS-DOS, provided standard operating system facilities, it just didn't provide enough to really make the hardware sing and dance. I know there is a lot of press talking about 'well behaved' software, referring to software which does and does not adhere religiously to the MS-DOS level. However, with the degree of hardware standardisation taking place, there's really little need to follow the boring old MS-DOS level. Much of the successful software today

#### **PROGRAMMING**

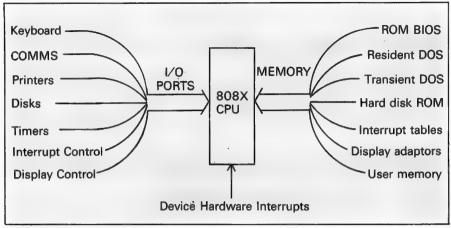


Fig 1: System architecture

Address		, Function
<b>00000</b> - 003FF	4	Interrupt Vectors
00400 - 004FF	1	BIOS data areas
00500 - BFFFF	! ! ! ! !	Primary RAM Area
A0000 - AFFFF	! !	Reserved
80000 - B3FFF	!	Memory mapped monochrome display adapter
B4000 - B7FFF	. !	
88000 - BFFFF	1	Memory mapped colour/graphics adapter
C0000 - CFFFF	!!	Optional hard disk ROM
D0000 - F3FFF	!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!	Reserved/Expansion Memory
F4000 - FFFFF	!	ROM BIOS and pootstrap loader

Fig 2: System memory map

digs into the Bios and hardware — Lotus 1-2-3, Flight Simulator, the majority of games, Crosstalk and dBase. Yet compare the screen refresh time of dBase, WordStar and Multiplan with that of Lotus. Moreover, dBase gets right down to the hardware level to implement its security, and Turbo Pascal happily provides all the necessary facilities to get at both Bios and hardware, as well as providing a special PC version which lets you do nifty things with the screen.

Let's face it, these days there is nothing really wrong with getting down to the Bios and hardware levels. MS-DOS v5 may invalidate that statement, but if it does, then it will also be going a long way towards turning PCs into minis, and that is not necessarily a good thing.

#### Hardware Architecture

Being an 808X based machine, the PC has two ways of connecting itself to devices. The first is through the memory address space, so called 'memory' mapping' which is common on most low-end micros. This has the advantage that devices and their control registers appear as normal memory locations, and can be manipulated using the normal instructions which affect memory. As the 808X has a minimum of one million addressable memory locations, it's easy to understand why a few thousand of these can be devoted to memory mapped devices without any great loss. Figure 1 shows an overview of the system architecture.

The second method is through the I/O

ports. The 808X can address up to 65,536 I/O ports, which appear to the machine in a similar way to main memory. The difference is that the I/O ports are quite distinct from memory and so, for example, memory address 200 and I/O port address 200 refer to quite different things. Physically, I/O port devices are connected up differently to memory mapped devices. Internally, special instructions must be used to access the ports and these instructions are not as versatile as the normal instructions used for manipulating memory. Whereas all high level languages are capable of accessing memory, not all are able to access the I/O ports. Basic can get at them through its OUT statement and INP function, Turbo Pascal provides the PORT array, and assembler, naturally, provides the IN and OUT instructions.

In general, all devices on the PC are accessed through I/O ports, and various de-facto standards exist specifying which I/O ports should be used for which devices. The display adaptors, however, also employ memory mapping. The controller chip for the adaptor is located in an I/O port, but the actual display buffer appears to the system as a normal chunk of memory.

Figure 2 shows a memory map of a typical PC. The exact placement of specific areas may vary slightly between compatibles depending on the size of the ROM Bios, type of hard disk, and several other factors. Note that the buffers for the display adaptors may start either at B0000 or B8000, depending on the type of display. Naturally, all software manipulates main memory, as the program itself and the data it works upon will be resident in it. Most software also manipulates the display adaptor buffers, as this is the only way to produce very rapid screen I/O. Products such as Lotus 1-2-3. Crosstalk, Multimate and almost all graphics software dive happily into screen memory, and through this, achieve their high performance and quality user interface. Messing about with the display memory introduces its special problems, such as determining the type of display and eliminating 'snow' on colour screens. We will be examining these problems and illustrating solutions for them later in

Figure 3 is a map of the I/O ports. Most software manages to get through life without directly manipulating the I/O ports. However, any high performance communications or graphics software would probably have to get involved with the ports, as there are many functions which DOS does not provide, but which can be achieved through the ports. Most

## AUSTRALIA'S NEXT FAVOURITE MOUSE.

## The best price: \$199

#### THE BEST HARDWARE:

LOGITECH has been the leading OEM mouse company for years, quietly providing mice to companies like AT&T, DEC, and H-P. We've designed LOGIMOUSE C7 just for the retail marketplace. And poured all our years of hardware engineering

into it. You simply can't find a better mouse.

■ IBM PC/XT/AT compatible through any serial port

■ NO pad, NO external power supply



■ HIGH (200 dpi) resolution

■ Tactile feedback switches

#### THE BEST SOFTWARE:

LOGIMOUSE is now available with all new software that sets new performance standards for the mouse:

#### **LOGIMOUSE Base Package**

\$199

\$220

■ LOGIMOUSE Driver Version 3.0: Faster and smaller. Makes LOGIMOUSE compatible with all Microsoft applications.

#### **LOGIMOUSE Plus Package**

■ LOGIMENU — Programmable Pop-Up Menu System: Customizable for all your favorite keyboard-based applications. Fully compatible with Microsoft Menu, only better.

- CLICK: A new concept in mouse software! It resides in memory, detects which application you are running and sets the mouse to your predefined setting. You define macros for the mouse buttons, set the mouse baud rate and protocol, define the pop-up menus to be used by LOGIMENU. Just add CLICK to your autoexec file and LOGIMOUSE will be ready to go with each of your favorite applications. So you can get down to work.
- POINT-AND-CLICK SHELL for Lotus 1-2-3: No more jerky cursor movement, no more delays, no more beeping. To select a cell, execute a command, scroll your spreadsheet, or call up context sensitive pop-up menus, just point with the mouse and click!
- POINT EDITOR—Mouse Based Program Editor: If you think a mouse was not meant for editing, POINT will change your mind.

  ALL PRICES EX TAX

Distributed and supported by:

## dataflow

Computer Services Pty Ltd 134 Barcom Avenue Rushcutters Bay 2011 Phone (02) 331 6153

NOW ALSO THE BUNDLED EX EACH

LOGIPAINT SET
With Base Package
With Plus Package

\$289 \$310

LOGIMOUSE C7 plus PC Paintbrush 3.0 is the most advanced paint set available for the PC. Use LOGIPAINT to design a logo, paint, or draw

a picture of a product you're developing. You won't believe its power with either free hand drawing or graphics.

## And from Logitech: Modula-2 at its absolute best!

Logitech Modula-2/86 Complete with Editor, Run Time System, Linker, Cursor-positioning debugger, 8087 Software Emulation, BCD module, Logitech's extended library, Utility to generate standard .EXE files. \$160

Logitech Modula-2/86 with 8087 support Even if you haven't yet gotten an 8087 co-processor, you can still use this version. \$233

Logitech Modula-2/86 Plus For machines with 512K or more. Takes advantage of the larger memory to increase compilation speed by 50%! Supports 80186 and 80286 as well as 8086 and 8088. Includes 8087 and 80287 support, too. \$340

Window Package Now you can build true windowing into your Modula-2/86 code with ease, too. Very powerful and full, yet only 15K in size. Features virtual screens, colour support, overlapping windows and a variety of borders. \$100

Run Time Debugger (source level) Much more powerful than just a symbolic RTD. Display source code, data, procedure call chain and raw memory. Set break points, assign values to variables, pinpoint and identify bugs in your source. The ultimate professional's tool! \$125

Utilities Package Features a post-mortem debugger for static debugging. Also includes a disassembler, a cross reference utility and a "version" utility that allows conditional compilation. \$89

Make Utility Automatically selects modules affected by code changes for quick and minimal recompilation and relinking. Even figures out dependencies for you. \$60

Library Sources Source code for our major library modules is now available – for customisation or exemplification. \$200

**ROM Package** If you need to produce rommable code, call for further information on this package.

Turbo Pascal Translator Now you can convert all your Turbo Pascal programmes into Modula-2 with ease. Take your library with you. \$100

#### **PROGRAMMING**

security systems make very heavy use of the ports, and so a quite transportable product may lock itself tightly to IBM compatible hardware simply through the use of security disks. Each of the controllers shown in the I/O port map corresponds to an actual chip, usually one manufactured by Intel. For a machine to be IBM compatible, it must not only use the same I/O ports for the same functions, but must also utilise exactly the same controller chips. In this series, we will also be looking at the most useful ports, what they do, and how to use them.

Figure 4 shows the interrupt map of the PC. The first kilobyte of memory is dedicated to the interrupt vectors. This is not an attribute of DOS or the Bios, rather it is something hardwired into 808X processors. Interrupts are numbered from zero to 255 and, when a particular interrupt occurs, the 808X automatically looks up the corresponding four byte address stored in the interrupt table, saves a few registers, and branches to that location. There are actually three different types of interrupts. The first are those generated internally by the 808X; for example, divide by zero and instruction single step. The second are those generated by external devices; for example, when the status of the communications adaptor changes or a disk completes an I/O. Finally, interrupts can be generated by software. This provides the mechanism by which DOS and the Bios can be called from user programs, as it makes the user program independent of the actual address of DOS or the Bios routines. For example, interrupt number 21 (hex) is the main DOS function dispatcher.

In an ideal ('well behaved') application, the program would not interact with any of these devices. Instead, the application would call DOS. DOS would call the Bios. and the Bios would deal with the devices knowing, as it does, where they are kept. what sort they are, and how to talk to them. However, since DOS (and even the Bios) does not provide the degree of control and flexibility required for many applications, it is often necessary to control the devices directly. While this reduces the degree of portability of your software, it does deliver a higher quality result and since most machines are IBM compatible, does not affect portability too seriously.

#### Software Architecture

On the surface, three levels of software exist. The highest level is the application program, whether it be dBase, Lotus or your latest Turbo Pascal program. The application software is concerned purely

Port	At	dres	55		Function
000		00F		!	DMA Controlier
020	arker.	021		F	Programmable Interrupt Controller
040	-	043		1	Timer/Counter
Ø60		<b>Ø</b> 63		1	Programmable Peripheral Interface
064				1	Keyboard Controller
				Ţ	
200	***	20F		Ţ	Game control adapter
2F8	-	2FF	3 Y 3	1	COM2: Serial comms adapter
378	methal .	37F		-1	Printer adapter
380		3BF		!	Monochrome display controller
3D0	*****	3DF		1	Colour/Graphics display controller
3FØ	1700	37F		1	Floppy disk controller
3F8	ano	3FF			COM1: Serial comms adapter
				1	

Fig 3: System I/O port map

Interrupt Numb	er	Function
0	!	Divide by Zero intercept
1	!	Single Step intercept
2	!	Non-Maskable interrupt
3	1	Breakpoint instruction vector
4	1	Overflow
5	!	Print Screen
8	1	Ticker (18.2 ticks per second)
9	!	Keyboard interrupt
E	1	Diskette interrupt
10	1	Video I/O
11	ŧ	Configuration determination
12	!	Memory size determination
13	!	Diskette I/O
14	1	Communications I/O
16	177.57	Keyboard 1/0
17	į.	Printer I/O
19	1	Bootstrap loader
1A	1	Time of day
1B	į	Keyboard interrupt extension
10	!	Ticker extension
20		DOS Program terminate
21	i	DOS Function dispatcher
22	!	DDS Terminate address
23	į.	DOS Control/break address
24	1	DOS Critical error handler
25	1	DOS Absolute disk read
26		DOS Absolute disk write
27	1	DOS (erminate & stay resident

Fig 4: Interrupt vectors

with the application — being an accounting system, word processor, or whatever.

Theoretically, when the application needs to do something involving the physical machine — open a file, read the keyboard, allocate memory — it asks DOS to do the work. DOS is accessed through a series of eight interrupts, with one of them, Int 21, providing over 50 different functions. DOS is concerned with files and other system resources in a very device independent fashion. That is, DOS doesn't tell you (or need to be told by you) whether a disk is a floppy or hard disk, how many sectors per track, how many surfaces, what sort of controller chip is being used, and where that chip is located.

DOS consists of two portions: resident and transient. The resident portion loads into low memory and provides the ablity to deal with the DOS requests an application program may issue. The transient portion loads into high memory and provides the command line parser and the ability to load other programs. The transient portion may be overwritten by memory hungry applications, in which case the resident portion can detect the fact and reload COMMAND. COM when it is next needed. One of the cardinal rules of an MS-DOS machine is that you are never allowed to know where in memory MS-DOS is located. In fact, it is possible to find out, but MS-DOS will not necessarily load into the same position each time the system is booted. Since you don't know where MS-DOS lives, access to it is via the software interrupts.

OEMs, manufacturers of compatible PCs, license MS-DOS from Microsoft. Some OEMs make extensive modifications to the standard MS-DOS before distributing it with their machine. For this reason, Microsoft says that there is no such thing as a 'standard' MS-DOS

# Four ways to pep up your PC



The Symptom

Headache – you need to run two programs simultaneously, without two PCs.

#### The Cure

DOUBLE DOS – The easy, economical system that runs any PC software – two at a time. It's like having two PCs in one.

Sort a database in the time it takes to write a memo. Print a spreadsheet while you update your accounting. In fact, do almost any two things you want with the same software you already have. It's fast, foolproof and so simple to use that you will be up and running in minutes.

#### The Symptom

Plague – Your PC flashes constant "disk full" messages, but you can't add another hard disk.

#### The Cure

CUBIT – The remarkable new software designed to squeeze the maximum capacity from your hard disk, floppies and even tape cassettes. Cubit simply reduces the number of bytes required to store a file, then converts the file back to its original size when retrieved. It's the most efficient and economical way to store information, and is based on a simple principle: Waste not, Want not.

#### The Symptom

Memory loss – You need to switch between programs without chewing up masses of memory.

#### The Cure

SOFTWARE CAROUSEL – You can load up to 10 programs at once, without memory-hungry "windows". And with a stroke of two keys, move directly from one application to another. And you don't have to give up any speed, power or performance of your PC or your software because your programs don't share system RAM. You have access to all available RAM for each and every program.

#### The Symptom

Lethargy – Your hard disk is taking longer and longer to load files.

#### The Cure

DISK OPTIMIZER – Cleans up your files. Ever since you first booted up your PC, DOS has been breaking up your files and storing different chunks in different places. Disk Optimizer puts them back together. Reading and writing is cut by as much as two thirds and, because head movement is reduced to a minimum, your disk can lead a longer, more productive life.



#### **Group of Companies**

Head Office: 2-3 the Postern, Castlecrag, NSW 2068. Phone (02) 958 2399, (008) 22 6733. Telex AA 75834 Canberra: 1 Pirie Street, Fyshwyck, ACT 2609. Phone (062) 80 7542 Malbourne: 24 Park Street, South Varra, Vic 3141, Phone (03) 820 0233

Melbourne: 24 Park Street, South Yarra, Vic 3141. Phone (03) 820 0233

## **MODEMS**



## Who'ya gonna call?

**V22** 

\$639 incl. freight & tax

\$556

CASE COMMUNICATIONS

**V22b** 

\$799 incl. freight & tax

\$695

Future-Proof Data Communications

CASE Communication Systems Ltd

10-12 Rodborough Road Frenchs Forest NSW 2086

V23

\$459 incl. freight & tax

\$395

Sydney Melbourne Brisbane Canberra 451 6655 529 7644 391 8288

80 5711

Perth Adelaide Auckland Wellington 322 5222 46 4062 39 4212 85 0250

Multiplexers • X25 Products • Data Switching • Modems • LANs • Protocol Converters • Telex Automation • Data Security

AD Marketing 7380 86

#### **PROGRAMMING**

Hicrosoft (R) Hacro Assembler Australian Personal Computer			10/15/86 15:17:47 Page : 8-1
	Page 68,132 TITLE Austral	ian Person	al Computer - Resident Clock
			sident Screen Based Digital Clock  Personal Computer Nagazine.
	1	October,	
	.Bail Pushes	Macro Erp	List Reg, (List)
		Push Enda Enda	Reg
	Pops	Hacro Irp Pop Ende Ende	List Reg, (List) Reg
	Convert	Hov	Register Al, Register Converter
0000	Hainseg	Segment Assuse	Para CS:Mainseq,BS:mainseq,SS:Mothing,EB:Mothing
8100 = 4744	Stame		Dien Art de l'Elegable Labertaine de 1901
= 0076	Attrib		78h
0100 0100 E9 01C4 R	Clock	Proc Jap	Far Inits
0103 EB 03 90 - 4567174-644. 0106 4744 to 45748-1458. 0108 90		Jap Do Pushf	Start Stamp
8111 9E 0112 1F	558 51		<pre>Cas,bx,cx,dx,es,ds,si,di&gt; cs di</pre>
9113 32 E4 8115 CD 1A 8117 GB C1 8119 98 DA 0118 D1 E2		Xor	Ah,Ah Tab - Fick count in CX:DX Ax,Cx Bx,Dv Dx,L
0119 01 D1 011F D1 E2		Rc1 Sh1	0x,1 0x,1
Microsoft (R) Macro Assembler Amstralian Personal Computer			18/15/86 15:17:47 Page 1-2
0121 01 01 0123 03 03		Rc1 Add	Cx,1 Dx,8x
8125 13 C1 1127 92 8128 89 E988		Adc Echg Hov	Ax,Cx Dx,Ax Cx,We996h Ax g Strip out Hours
0128 F7 F1 0129 98 00 012F 33 C0		Biv Nov Yor	Cx Bx <sub>v</sub> Ax Az <sub>v</sub> Ax
0131 F7 F1 9133 00 03	,	Div Nov	Cx Bx,Bx
9135 89 8008 9138 F7 F1 813A 88 FA 64		Hov Div Cmp	Cx 90cBh Cx 91,64h
9130 72 83 8130 90 EA 64 9142 FS (Unedit to ASS). To	Decimals:	Jb Bub Cec	Decinals Dl,64h
8143 8A BA 8145 B1 D8	341.44177	Nov Rc1	B1,D1 - R 57% 8 % Seconds Ax,1
#147 32 U2		Rc1 Way	D1,B1 Dx,1 Cx,003ch
8149 D1 D2 8148 B9 863C		Biv Mov Div	Cx Bh,Bi Cl
814B 99 863C 814E F7 F1 815B 8A FA			Al,Ah
814B B9 883C 814E F7 F1		Convert	
8148 D9 863C 814E F7 F1 8150 94 F4 8152 F6 F1 8154 86 C4 8156 88 C8		Hov	Si, Offset Buffer Ch Cl Bh ; Convert into display buffe
814B 89 863C 814E F7 F1 815B 8A FA 9152 F6 F1 8154 86 C4 8156 88 C8		Hov Convert Convert Convert Convert	Si, Offset Buffer Ch Cl Bh ; Convert into display buffe

```
017A BE CB
017C 3D 0000
817F 74 98
6181 BA 83BA
                                                                              Es, Ax
Ax, Bb800h
Nowait
Dx, 3dah
Al,Dx
                                                                                                         ; If colour screen
0181 BA 8384
0184 EC
0185 AB 08
0187 74 FB
0189 FC
018A F3/ A5
                                             Wait_horiza
                                                                    Test
                                                                               A1.8
                                                                                Weit_horiz (% ) Then eliminate snow
                                             Nowait:
                                                                    Cld
                                                                               Hovsu (1884) 4 Copy buffer to screen
                                                                    Pogs (di,si,de,es,dx,cx,bx,ax)
Popf
Jee Deord Ptr cs:[Chain_Dfs] ; Chain through
8194 9D
8195 2E: FF 2E 819A R
                                             Chain_Ofs
 819C ????
019E ????
01A0 68 70
                                             Chain_Seg
Screen
Buffer
                                                                               'h', Attrib
 01A2 68 70
01A4 3A 70
                                                                               'h', Attrib
Microsoft (R) Macro Assembler Version 4.00
Australian Personal Computer - Resident Clock
                                                                                     10/15/86 15:17:47
81.KA 60 70
81.A8 60 78
81.AA 3A 70
81.AC 73 70
81.AC 73 70
81.KM 2E 70
81.BM 2E 70
                                                                               'm'. Attrib
'm'. Attrib
'a', Attrib
                                                                    db
db
db
db
                                                                               's', Attrab
                                                                               'd', Attrib
B184 64 70
                                                                    db
                                                                               'd', Attrib
0134
WIBE D4 GA
0138 05 3030
WIWE 08 24
018D 86 44 02
0100 83 C6 86
                                                                   Proc Near ; converts AL into DS:SI
                                             Converter
                                                                   Add Ax,3838h
Mov [S1],Ah
                                                                   Nov [Si+2],Al
Add Si,6
 B1C3 C3
                                                                   Ret
                                             Converter
                                                                    ****************
                                                                     + INITIALISE
                                                                    *************
 81C4 BE
81C5 1F
                                             Inits:
                                                                              On Salamana Data addressability via OS
                                                                    Pop
 01C6 B8 351C
01C9 CD 21
                                                                               Ax,351ch . Find Ticker Vector in ES:BX
                                                                    Int
 01CB 26: 81 7F 83 4944
0101 74 38
                                                                    Cap
Je
                                                                               Es:[Bx+3], Steep ; Are we already loaded?
                                                                               Already
0183 BC 06 619C R
6107 09 1E 019A R
010B BA 0217 R
010E 84 09
01E0 CD 21
                                                                               [Chain_Geg],Es | 3 Preserve the Ticker chain [Chain_Ofs],Bx
                                                                               Dx, Offset Welcome
ah,9
21h - Mind Canal Control of the display Message
 lat
                                                                               11h
                                                                    Hov
And
Cap
                                                                               Dx, 86000h
Al, 38h
Al, 38h
                                                                               None Screen
                                                                    36
 01ED WA MANN
01F8 89 16 019E R
01F4 BA 0183 R
                                             Mono_Screens
                                                                               EScreenl,Dx : Set Screen base address
Dx, Offset Handler
01F4 BA 0103 R
B1F7 DB 251C
01FA CD 21
01FC HU 11HH
01FF BA 01C4 R
8202 B1 04
8204 D3 EA
8206 B3 C2 10
                                                                                                         1 Bet Dos to reset Tick Vector
                                                                    Hov
Int
                                                                                Ax, 251ch
21b
                                                                                Ax,3196h
                                                                    Hov
Hov
Shr
Add
                                                                               Dx, Offset Inits
Cl, 4
Bx, Cl
Dx, 10h
                                                                               21h ... Financia Terminate & Stay Resident
 6209 CD 21
                                                                                     18/15/96 15:17:47
Hicrosoft (R) Macro Assembler Version 4.88
Australian Personal Computer - Resident Clock
                                                                                     Page: -1-4
8280 BA 8235 R Alleady: Already: 8280 B4 89 8210 CD 21 8212 B0 4CBB
                                                                    Hov
Hov
Int
                                                                               Dx, Offset Error
                                                                               Ah,9
21h - annual & ; Call BQS to display message
                                                                                Ax,4c80h
                                                                                         Minister of Exit without a trace
 9215 CD 21
                                                                     int
                                                                               21h
 8217 80 8A 41 50 43 28 43
                                                                                Bdh,Bah,'APE Dlock is now resident',Bdh,Bah,'S
          6C 6F 63 6B 2B 69 73
```

#### **PROGRAMMING**

ALREADY	L NEAR		MAINSEG
Nane	Tyge	Value	Attr
Symbols:			
MAINSES	824F	PARA	NONE
Name	Size	Align	Combine Class
Segments and Groups:			
PUSHES	3		
CONVERT	2		
Hane	Lines		
Nacros:			
Microsoft (R) Macro Assembler Va Australian Personal Computer - Re			18/15/86 15:17:47 Symbols-1
		End	
	lock ainSeg	EndS	
PA MB UB FD LO			
64 79 28 6C 6F 61 64 65 64 8D 8A 24			
8235 8D 8A 87 43 6C 6F 63 Er 68 28 61 6C 72 65 61	rror -	db	#dh.Bah.97h,'Clock aiready loaded', #dh.Bah. '\$'
8A 24			
20 6E 6F 77 20 72 65 73 69 64 65 6E 74 0D			

```
L BYTE 01A0
L WORD #19C
                                         MAINSEG
                              F PROC 8186
                                          MAINSES Length = 014F
                                          MAINSES Length = 8886
N PROC 8186
DECIMALS . . . . . . . . . . . . . . . .
                             L NEAR 0142
L BYTE 8235
                                         MAINSEE
HANDLER . . . . . . . . . . . . . . . .
                             I MEAR $183
                                         MATHREE
                             I MEAR GICA
                                         MAINSER
I MEAR BIRA
                                          MAINSER
                             L NEAR BIRG
                                         MATHREE
L NORD D19E
                                         MAINSES
STAMP .....
                             Number 4944
L NEAR 8188
                                         MAINSEG
WAIT_HORIZ . . . . . . . . . . . . .
                             L NEAR 8184
L BYTE 8217
   183 Source Lines
   44 Symbols
 49332 Bytes symbol space free
    B Warning Errors
                                                     LISTING ONE
```

from the internals point of view. However, every MS-DOS you use should employ the same interrupts and functions for the same purpose with the same parameter conventions.

DOS, in turn, passes requests down to the Bios.

The Bios is implemented in permanent ROM, and knows all about the hardware in intimate detail. It knows where the FDC chip is located and what type of chip has been used; it also knows how to self test the machine and how to bootstrap MS-DOS. Although the Bios is in ROM, interrupt vectors are used to point to the various routines. This means that the location of a Bios routine may be different in different machines, but as long as the same interrupt numbers are used and the parameters are the same. the Bios may be considered to be compatible. When a diskette boots, modifications to be Bios may be loaded into RAM and the interrupt table altered to point at the new routines. This allows Bios bugs to be corrected, and also allows system programmers to intercept Bios calls.

Figure five shows the hierarchy of the software architecture. In well behaved software, calls flow down from the application through DOS and the Bios to the hardware, and the results then flow back to the application by following the same path in reverse.

The exciting point about all this is that since the machine is a PC, we can get involved at any point along the way. We can alter the requests, ignore them, do something different or just report on them. We can do this, not only for diskette calls, but for anything going on

```
Australian Personal Computer Magazine
110 :
120
                  ___________
130
                        .COM & .EXE file Generator
150
160
170
180 DEFINT A-Z
190 READ FILENAMES
200 KILL FILENAMES
210 DPEN FILENAMES AS #1 LEN=1
220 FIELD #1, 1 AS DUTPUT$
230 COUNTER = 0
240 PRINT "Generating...."
250 READ LINE. IDENTS
260 IF LINE. IDENT$ = "END" THEN GOTO 430
270 CHECKSUM=0
280 BYTE.POS=0
290 READ ITEMS
300 IF ITEM$ = "$" THEN GOTO 390
310 BYTE = VAL("&h"+ITEM$)
320 BYTE.POS=BYTE.POS+1
330 COUNTER = COUNTER + 1
340 CHECKSUM=CHECKSUM + (BYTE.POS * BYTE)
350 IF CHECKSUM > 9999 THEN CHECKSUM= CHECKSUM - 9999
360 LSET OUTPUT$=CHR$(BYTE)
370 PUT #1
380 GOTO 290
390 READ VERIFYSUM
400 IF CHECKSUM = VERIFYSUM THEN GOTO 250
410 PRINT "Incorrect data at DATA line commencing "; LINE.IDENT$
420 STOP
430 READ SIZE
440 IF SIZE = COUNTER THEN GOTO 490
450 PRINT
          "Error - bytes missing.
460 PRINT "Expected "; SIZE; " bytes, only read "; COUNTER
470 STOP
480 CLOSE #1
490 PRINT "Generated file "; FILENAME$
                                                              LISTING TWO
```

in the system (as well as things which normally don't go on in the system). This means that we can make an otherwise lame PC sing and dance.

Most software gets involved at all three levels. For example, a good communications package would use MS-DOS calls to access files and read the keyboard, Bios routines to access the asynch port, and go direct to hardware

for screen I/O and possibly for access to the UART. Even a product which stays religiously to the MS-DOS call level, such as dBase, gets right down to hardware level for its security validation. The humble WordStar is another which mainly keeps to the MS-DOS level, yet it calls the Bios to do printing.

At this point, it is interesting to introduce the issue of IBM compatibility.

## IN 85 WE REACHED FOR THE SKY **IN 86 WE GOT IT**



hundreds.

capability.

international character sets.

high resolution graphics

It might be Citizen's complete

Or speed: 160-200 cps draft speed and 40-50 cps correspondence quality. Maybe it's compatibility: switchable to Epson or IBM. Or perhaps it's because more than 200 of Australia's top dealers are putting their faith in Citizen. Whatever it is, when we reached for the sky in '85 we knew we couldn't miss.

Simply because, with the Citizen range of dot matrix printers, we knew we had a stable of stars on our hands.

## CITIZEN PRINTERS

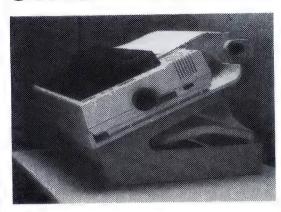


#### THE BIG AUSTRA

376-380 Lane Cove Rd North Ryde, NSW 2113 Telex: AA24160

Sydney (02) 887 9333 Brisbane (07) 44 6351 Perth (09) 364 7077 Newcastle (049) 2 4837 Melbourne (03) 699 5255 Adelaide (08) 363 0699 Canberra (062) 80 5332 Hobart (002) 34 9900

#### COMPAK'S STACK n STAND



Stack printer paper and feed the printout under your printer. Your desk is expensive real estate. Save space.

\$95.00 inc Tax (for 10" printers)

\$5 freight

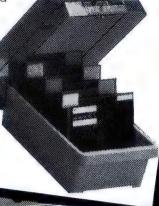


#### Hinged Lid — Latest Design Lockable disk boxes

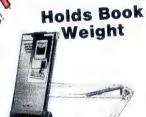
Smoked perspex lid and separators Holds 85+ disks

only \$23.00 Freight \$5

New design



improved designide with better line guide sell



#### How much are your eyes worth?

Special price for adjustable document holders

\$39.00 Freight \$5

STAR SP15

15" WIDE 16k BUFFERS STANDARD

\$375 inc tax NEAR LETTER QUALITY & IBM CHARACTERS





Computer Centre 156 Martin Street Gardenvale, Vic. 3185 Telephone. (03) 596 7222 Fax: 5970126

Telex. AA 38029 Quote Rel. 841203 A.B. YEAS

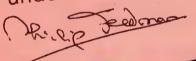
PTY. LTD.



## Compak's ZENO Software Pledge:

Customers are free to return the computer for full refund in the first four weeks after purchase if they show the original disk of any commercially distributed program that runs on the IBM PC/XT and that cannot run on the ZENO PC/XT.

(Please note that programmes that use basic need to operate under GW Basic.)



ZENO PC/XT

including tax (monitor extra)

ZENO PC/XT with all specifications below 20 megabyte hard disk — Tandon slimline

\$1849 inc tax \$1295 inc tax

## Technical Advantages

of ZENO PC/XT 1. The standard speed of the IBM PC/XT is 4.77 M/Hz. The ZENO PC/XT zips along at 8.0 M/Hz although you can slow it down to IBM's pace at the flick of a Switch. That's a full 68% faster for a machine thats half the price. 2. There is a front reset button for those that don't have arms as long as a gorilla. 3. The ZENO PC/XT gives you security. With the turn of a key you can lock out the keyboard while the computer is running. Great for little kids at home and bigger kids in the office!

### ZENO PC/XT Specifications:

- \* 640k on motherboard \* Twin 360k drives
- \* 8 slots
- \* Multi-function card \* Video card with colour/mono outputs
- \* RS232 serial (second port optional) \* Security key to stop unauthorised access
- \* Front reset button
- \* Parallel printer port
- \* Joystick port
- \* Light pen port Battery backed up clock
- Hinged lid for easy access
- \* Sculpted ergonomic keyboard
- \* 4 layer board for reliability

#### **PROGRAMMING**

```
1000 DATA
            "clock.com"
                                                                          7587
                 E9, C1, 00, EB, 03, 90, 44, 49, 90, 50, 53, 51,
10110
     DATA
                                  57,
                                                                          7720
                 52, 06,
                         1E, 56,
                                      ØE, 1F,
                                              32, E4,
                                                       CD, 1A, 8B,
1020
     DATA
                C1, 8B, DA, D1, E2, D1, D1, D1, E2, D1, D1, Ø3,
                                                                          3940
1030
     DATA
                D3, 13, C1,
                                                                          2558
                             92.
                                  B9, ØB, E9, F7, F1, 8B,
                                                           D8. 33.
1040
     DATA
1050
     DATA
                CØ, F7, F1, 8B, D3, B9, C8, ØØ, F7, F1, 8Ø, FA,
                                                                          4572
                 64, 72, 03, 80,
                                                                          2379
1060
     DATA
                                  EA, 64, F5, BA, DA, D1,
                                                           DØ, 32,
                 D2, D1, D2, B9, 3C, 00, F7, F1, 8A, FA,
                                                                          5294
1070
     DATA
1080
     DATA
            8
                 86, C4, 8B,
                              C8,
                                 BE, AØ, Ø1, 8A,
                                                   C5, E8,
                                                           56. 20.
                                                                          9803
                 BA,
                     C1,
                         EB,
                             51,
1090
     DATA
                                  00, BA,
                                          С7,
                                              E8, 4C, 00,
                                                           8A, C3,
                                                                          164
                                                                          9035
                 E8, 47, 00, 89, 08, 00, BE, A0, 01, 33, FF, A1,
1100
     DATA
           10
                                               74,
                 9E, 01,
                         BE,
                                                                          8185
                                  3D, 00, B0,
                                                   ØB. BA. DA. Ø3.
1110
     DATA
           11
                             CØ.
     DATA
           12
                 EC, AB, ØB,
                                  FB, FC, F3, A5, 5F, 5E, 1F,
                                                                          9068
1120
                 5A, 59, 5B, 58,
                                  9D, 2E, FF,
                                                       01, 00,
                                                                          5503
1130
     DATA
           13
1140
     DATA
           14
                 00, 00, 00,
                              00, 68, 70, 68, 70, 3A, 70, 6D,
                                                                70.
                                                                          7001
                                                                70.
1150
     DATA
           15
                 6D, 70,
                         3A,
                              70,
                                  73, 70,
                                           73,
                                               70, 2E, 70, 64,
                                                                          7881
                                  05,
                                                                          5193
                     70,
                             ØA,
                                                   24, 88,
1160 DATA
           16
                 64.
                         D4,
                                      30,
                                          30. 88.
                                                           44. 02.
                 83, C6, Ø6, C3, ØE, 1F, B8, 1C, 35, CD, 21, 26,
                                                                          6439
           17
1170
     DATA
           18
                     7F.
                         03,
                              44.
                                  49, 74,
                                          38, 8C, 06,
                                                                          6506
1180
     DATA
                 81.
                1E, 9A, 01, BA, 17, 02, B4, 09, CD, 21,
                                                                          7178
1190
     DATA
                                                                88,
                 BA, 00, B0,
                                                           00,
1200
     DATA
                              24, 30, 30,
                                          30, 74,
                                                   Ø3, BA,
                                                                          6817
                                          01,
                                                       25,
1210 DATA
                                                           CD, 21,
          *21
                 B9, 16, 9E,
                              01,
                                  BA, Ø3,
                                               B8, 1C,
                                                                          6359
                                                           83, C2,
                                                                          1341
                 BB, 00, 31, BA, C4, 01, B1, 04, D3, EA,
1220 DATA
           22
                                  35, 02, B4,
                                               09, CD, 21, 88, 00,
                                                                          7077
                 10,
                         21,
           23
                              BA.
1230 DATA
                    CD,
                 4C, CD, 21, ØD, ØA, 41, 50, 43, 20, 43, 6C, 6F,
                                                                          5651
1240
     DATA
           24
                 63, 68, 20, 69, 73, 20, 6E, 6F, 77, 20,
                                                                          7111
1250
     DATA
1260
                 73, 69, 64, 65, 6E, 74, 0D, 0A, 24, 0D, 0A, 07, 43, 6C, 6F, 63, 6B, 20, 61, 6C, 72, 65, 61, 64,
                                                                          3094
     DATA
                                      20,
                                           61,
                                               6C,
                                                                          7585
1270
     DATA
           27
                     20, 60,
                                                   0D. ØA.
                                                                          4158
12BØ DATA
           28
                             6F, 61,
                                      64.
                                           65. 64.
1290 DATA END,
                                                              LISTING THREE
```

Machines which provide only MS-DOS support can run only software which keeps to the MS-DOS level, ie, not much. Machines which also provide Bios level compatibility will generally run most software, but will fail security disk validations.

For a machine to be truly compatible, it must not only run MS-DOS, but also faithfully reproduce the Bios, so that not only do the same interrupt numbers do the same things, but they also pass parameters through the same registers. Additionally, the machine must have its (FDC, devices screen, keyboard controller, and so on), mapped to the same I/O port addresses, and must use controller chips which are functionally identical to those found in the IBM PC. For example, I once had problems with communications software on а Taiwanese machine because manufacturers used a slightly different UART chip which functioned identically except for not clearing out the error reason bits when the error bit was not on.

The vast majority of machines calling themselves compatible adhere to the IBM standards. Some do not, and these seem to have drifted away quietly.

#### Calling the system

All calls to both the DOS and Bios are made through the software interrupts. This is achieved by loading up various CPU registers with codes and pointers, and then executing a software interrupt. The interrupt is generated by an 808X instruction. The instruction is two bytes long, with the second byte indicating which interrupt is to be performed, for example, Int 21h. Not all high level

languages provide the ability to write machine language intermixed with normal statements, however, most provide a facility for calling external subroutines written in any language. This can be used to create an assembly language subroutine which issues the interrupt and returns the result to the high level program. Turbo Pascal provides a very good facility for loading registers and making interrupts, and is possibly one of the best languages for DOS and Bios experiments.

Although it is possible to call DOS from a high level language, no high level

language is well suited to becoming part of DOS or the Bios. For this, assembler is needed as absolute control over the registers is required.

A good understanding of how the software levels and hardware interact can be achieved by following the flow of events when an application program requests a DOS function, for example opening a file.

Initially, the application program creates a buffer containing the name of the file. It points the registers DS;DX at the buffer, loads AL with an access mode, and AH with the value 3Dh. It then performs an INT 21h. Software interrupt number 21h is the main DOS function dispatcher, and uses the contents of AH to determine what function is being requested — in this case, 3Dh, which opens a file.

The function dispatcher must then search the directory, either use or create a directory entry for that file, and hand a return code back to the application program. To read and write the directory, the function dispatcher calls another part of DOS, INT 25h and INT26h. These functions provide a read sector/write sector interface based on simple sector numbers, that is, it doesn't matter what sort of disk it is, how many sectors per track or how many surfaces. Sectors are numbered from zero through to the end.

INT 25h and INT 26h then pass control to the ROM Bios. This is done through interrupt number 13h, and DOS must translate its simple sector number

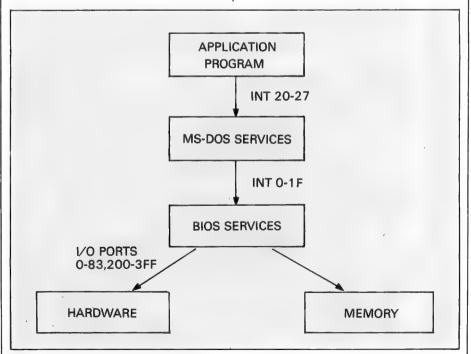


Fig 4: The software architecture



**GIVING YOU ACCESS TO:** 

## /IATE

- 100's OF PROGRAMS TO DOWNLOAD
- COMPUTER NEWS
- HARDWARE & SOFTWARE TIPS
- TELESHOPPING
- INTERACTIVE STRATEGY **GAMES**

and much much more!!!

#### PACKAGE INCLUDES:

- PUSH BUTTON HANDSET
- MODEM
- VIDEOTEX COMMUNICATIONS SOFTWARE
- TELESOFTWARE DOWNLOAD
- TERMINAL COMMUNICATIONS SOFTWARE
- MICROTEX 666 SUBSCRIPTION
- FREE MEMBERSHIP TO CLUB 64
- FULL INSTRUCTION BOOKLET
- AND IT'S AUSTRALIAN MADE

To order or for more information simply phone our hotline

(03) 419 0300

Information Solutions





Now everyone can afford a 24-pin printer...

## MicroHelp and Fujitsu announce the DL2400.

You deserve a better printer.

The Fujitsu DL2400 delivers an exceptional print quality as well as a fast draft speed.

The DL2400's full width carriage allows up to 244 columns of text-ideal for those large spreadsheets. Its technical superiority and high reliability are winning plaudits from those PC users who need the best in dot matrix printing. The DL2400 is the quiet achiever averaging under 55dBA.

Just like the big 1200 line per minute printers Fujitsu also builds, the DL2400 supports a heavy workload with a high duty-cycle. The DL2400 is a real printer. Something of quality. Not a plastic cheap and nasty.

Every DL2400 user raves about how they can load both single-sheets in a bin and continuous stationery simultaneously without needing to remove and install tractors or feeders. Computer paper is rear sprocket fed so that extra sheet is not wasted when you want to tear off your printout. Changing ribbons over is a snap with a choice of re-usable cartridges with inexpensive refills.

Users marvel at the DL2400 LCD character display operator panel which allows them to select and configure all printer Take a look at one today. features with full prompting.

IBM graphics printer but the DL2400 command set also includes all the options for setting different type-styles and modes.



You really do deserve a better printer.

## MicroHelp

**Fujitsu Printer Distributor** 

361 St. Georges Road North Fitzroy, Vic. 3068 (03) 486 1555

#### Brisbane

The Logical Solution (07) 265 6108

#### **PROGRAMMING**

into a head number, track number and sector within track number. Since the Bios deals directly with the hardware, it needs the request in terms it can understand, that is, relevant to the type of disk drive attached.

The Bios diskette handler, INT 13h, then starts sending a series of bytes to the I/O ports 3F8 to 3FF. The floppy disk controller chip (FDC) is attached to these ports, and it can control the physical drive. The ROM Bios issues a series of commands through I/O port 3F8, making the FDC start the drive, seek to the relevant track, read a sector and pass it back.

Control then flows back up through the structure, passing return codes all the way.

### Example: resident software

This month, we offer a small program which makes use of both DOS and Bios functions to terminate and stay resident. The program produces a digital clock located in the top left corner of the screen. The clock is updated continuously no matter what your machine is doing, and is accurate to one hundredth of a second.

The program is intended as a taste of things to come, and hence we will not be getting too involved with explanations of how it works and why it does what it does. The facilities used by the program will be revisited later in the series, with full explanations at that time.

Broadly, however, the program consists of two parts. The first part is executed when the program is first run, and hooks the second part of the program up to the system ticker. The ticker is an interrupt which is called 18.2 (approx) times per second. The program then determines what type of screen is connected and terminates but stays resident, disposing of those pieces of itself which will no longer be needed.

The second portion is called by the ticker, and 18.2 times each second calls a Bios service to determine the number of ticks since midnight. It converts this tick count to a time in HH:MM:SS.DD format, and displays the result on the screen. On colour screens, snow is avoided by waiting until the horizontal retrace period.

This program should run successfully on most IBM PCs and true compatibles. Some customised DOSs may present problems as they maintain the system time in a different way. If your machine is one of these, the symptom will be that the time displayed is not necessarily the time DOS thinks it is.

#### Running the example

Almost all of the programs presented in this series will be written in assembler, as it is the only language suitable for low level operating system work. However, for readers without an assembler, we do provide an alternative method of loading the software.

Listing one shows the assembler code for the resident clock. The assembler used was Microsoft MASM version 4, but another assembler could serve equally well. Readers with an assembler should simply type this program into a file, for example CLOCK.ASM, and then compile and link it using the following commands:

MASM CLOCK; LINK CLOCK; EXE2BIN CLOCK DEL CLOCK.EXE

These commands will result in a CLOCK.COM file which can be immediately run. Be sure you enter the program correctly, as any mistakes are likely to cause a system crash.

For readers without an assembler, we are using a technique this publication and its sister publications have employed for many years. Listing two shows a Basic program written for the GW-BASIC, BASICA or BASIC interpreters. This program forms the basis of a 'loader' which can be used each month with any of the programs we present. Listing three is a set of DATA statements which, when combined with the loader, will generate CLOCK.COM.

Be sure that you enter the DATA statements correctly. If any of your DATA statements are incorrect, the loader will probably detect it as it verifies the total number of bytes and a checksum for each line. The first element in each line is a line identifier which can be used to locate errors, and the last element is a checksum. The checksum is positionally weighted, so a transposition error will generally be detected. Once you have entered this program, simply RUN it and, if it were entered correctly, it will generate CLOCK.COM. You can then exit from Basic back to DOS and run CLOCK.COM. There is no difference between the CLOCK.COM produced by an assembler and the one produced by Basic. except that readers with assemblers will be able to modify and enhance the program.

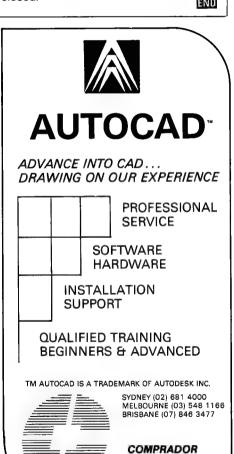
When you have generated CLOCK.-COM, keep your Basic program, as next month you can simply delete the old DATA statements, type in the new ones, and generate the next program.

This program is also available as telesoftware on Viatel. In case you haven't got into Viatel yet, it's probably

worth a mention. No one really likes typing in long programs and trying to get them right. Through the use of Telecom Viatel, you can connect your machine via a modem to Microtex 666, Viatel's largest service provider, and download software through the telephone. Microtex has over 20,000 pages of telesoftware for a wide variety of machines including the PC. Some of the software is free, others are charged small fees, usually a dollar or two. The best part is, since the software is delivered electronically, no sales tax is payable! In addition to telesoftware. Microtex (and Viatel in general) provide a host of useful services, activities. social involvements and information.

#### Next Month

Next month the introduction continues with a look at the 808X processor, the Bios routines, DOS interrupts and DOS functions. Following the completion of this ground-work, we'll be getting stuck into lots of resident software, drivers, hypervisors and pop-up utilities. By the time you've finished the series, you'll be able to build a Sidekick with your eyes closed.



SYSTEMS PTY LTD

## FLASH!!

## A NEW FLASHPRINT FOR PRINTING

**FLASHPRINT** has solved printing problems for thousands of Wordstar users. Now it's even better.

Modern printers have dozens of commands. Until now it has been impossible to send all of these codes from a Wordstar file. Most printer demonstrations are in computer code, not Wordstar.

New **FLASHPRINT/4** changes the world of Wordstar and printers. Now you can print anything — even large letters.

Print BIG and little and manything your printer san/print!!

**FLASHPRINT** is supplied with command files for several popular printers. But you can chose the command and the coding your printer needs.

We even include notes on designing your own characters such as boats, cars and graphic symbols.

**FLASHPRINT** requires no special knowledge and Wordstar requires absolutely no installation.

There's more. FLASHPRINT/4 includes FLASHKEY. This allows any Wordstar character (including control characters) to be a function. That's 127 function keys on your computer. Functions can contain hundreds of bytes. FLASHKEY also allows key translation. You can create a Dvorak keyboard or change Wordstar's clumsy commands.

**68** CP/M-80 version is available in more than 100 formats. Please add \$6 for Microbee 3.5-inch and 8-inch IBM standard to cover additional costs. Requires Wordstar version 2.26, 3.0 or 3.3. The MS.PC-DOS version is normally 360K 5.25-inch disk for Wordstar V3.3. Please include \$5 for packing and postage.

**FLASHPRINT MARK II** requires PCor MS-DOS. A special version is required for the NEC APC III. Please add \$5 for packing and air mail delivery.

JRT SOFTWARE
42 TURNERS AVENUE

COROMANDEL VALLEY STH AUSTRALIA 5051 (08) 278-7076

## You're in Good Company When You Program in BetterBASIC



All of these companies rely on BetterBASIC to write their software programs. They have found that BetterBASIC combines the features they need from BASIC, Pascal, C and Forth in one familiar environment. Some of these features include the following.

**640K** Now you can use the full memory of your PC to develop large programs.

**STRUCTURED** Create well organized programs using procedures and functions that are easily identified and understood and completely reusable in future programs.

MODULAR Use procedures and functions grouped together to form "library modules."

INTERACTIVE BetterBASIC acts like an interpreter, responding to the users' commands in an immediate mode. However, each statement is actually compiled as it is entered. Compatible with BASICA and GWBASIC.

**EXTENSIBLE** Create your own Better-BASIC modules which contain BetterBASIC extensions (ideal for OEMs).

**COMPILED** Each line of the program is compiled as it is entered into the computer's memory rather than inter-

preted at runtime. The optional Runtime System generates EXE. files.

**BetterBASIC** Runs on IBM PC, IBM PC/XT and compatibles.

CALL (02) 451 1256. Order Better-BASIC now, or write to

14 Coora Avenue, Belrose, 2085. BetterBASIC: \$495 Runtime System: \$599 8087/80287 Maths: \$265

Still not convinced? Order the Better-BASIC sample disk which includes a demo, a tutorial, compatibility issues, 50 lines of BetterBASIC and more. Only \$10.

Mastercard and Bankcard accepted.

BetterBASIC is a registered trademark of Summit Software Technology, Inc.

IBM PC and IBM PC/XT are registered trademarks of International Business Machines Corp.

Illustrated above are registered trademarks of the following companies: Mobil Oil Corp.; AT & T; General Electric Co.; Westinghouse Electric Corp.; TRW, Inc.





# Spinning the Token Ring

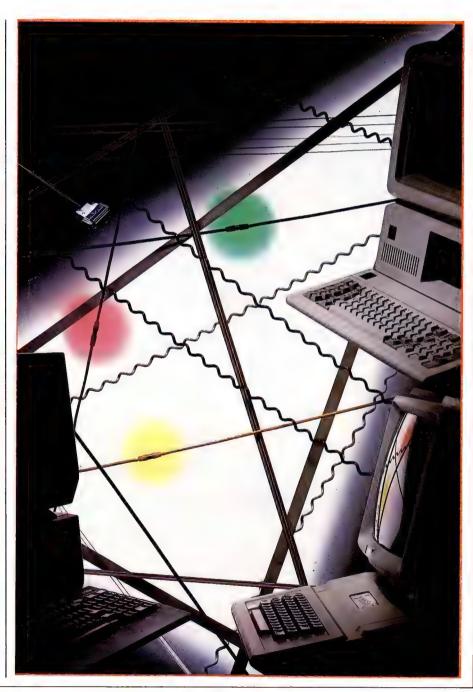
At long last IBM's
Token Ring has arrived.
In the second part
of our look at networks
Paolo Baccanello
sees it in action.

Unlike PC network, IBM's Token Ring is an unexceptional product. It is unexceptional in the sense that, like so many of IBM's hardware products, it looks set to become a standard. Since it was announced in the spring of 1985, major participants in the PC LAN market (such as Excelan, 3Com. Bridge Communications, Corvus, Gateway, Nestar and Novell) have either announced compatible products, or gateways between Token Ring and their own established Ethernet or TCP/IP-based products.

Given PC Network's failure to excite an obviously discerning market, why the interest in Token Ring? In order to understand this we visited an actual installation to take a closer look at IBM's Token Ring in action.

On the hardware side, IBM's Token Ring consists of three basic components — adaptor card, cable and wiring concentrator. The adaptor card is sparsely populated, with a Texas Instruments RM 380 chip set providing the communications capability and a 9-pin D-type plug making the connection at its exposed end. It fits into a full length expansion slot inside the PC's system unit and costs \$1338.

Before you physically install the card in your PC, two blocks of DIP switches can be set to take into account any exotic configurations. Switches on one block allow you to determine where within the PC's memory the card's instruction code will be located and how it communicates with the PC's CPU. These need to be reset if you are installing the Token Ring adaptor card alongside a 3278-9



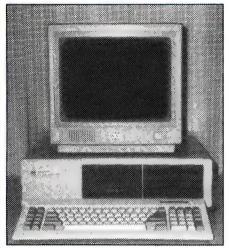


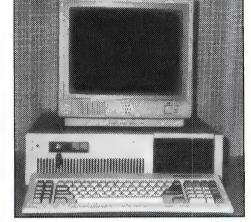
## ATLANTIS INTERNATIONAL COMPUTERS

IMPORTERS SUPPLIERS DISTRIBUTORS & SALES

49 WADHAM PARADE, MT. WAVERLEY, VIC. 3149

PHONE: 277 3139, 277 7187





#### Atlantis PC/XT 640K Ram

- 4 Layer Mother Board
- 2 x MITAC 360K Drives
- 1 x Multifunction Car
- 1 x Parallel Port
- 1 x Serial Port
- 1 x Jovstick Port
- 1 x Mono/Color Graphics Card
- 150 Watt Power Supply

AT Style Keyboard

12 Months Warranty

\$1695.00

#### Commodore Modern \$145

Full Range of Accessories Atlantis AT and Other Configurations available on request without notice

- \* Prices Subject to Change Without Notice
- \* All Systems Include MS-DOS 2.11
- \* Assembled in Australia using Japanese Components by ATLANTIS International Computers

#### Atlantis Turbo 477/8

- 4 Layer Mother Board
- 2 x MITAC 360K Drives
- 1 x Multifunction Car
- 1 x Parallel Port
- 1 x Serial Port
- 1 x Joystick Port
- 1 x Mono/Color Graphics Card
- 150 Watt Power Supply
- AT Style Keyboard
- 12 Months Warranty

\$1895.00

#### **MONITORS**

Color Monitor	\$799
Green Screen	\$199
Amber Screen	\$205
Green TTL	\$225
Amber TTL	\$229

#### PRINTERS

Super 5 EP 1090 100 cps	\$449
Super 5 EP 1201 120cps & NLG	\$599
Super 5 Ep 1802 180cps & NLQ	\$849
CPB-13 15 inch 130cps	\$849
Brother 1509 15 inch	\$1099

#### Atlantis Mini AT 640K/80826

4 Layer Motherboard 2 x 1.2mb Floppy Drives Serial & Parallel Port FDD/C Card Power Supply Keyboard Mono/Color Graphics Card

\$2995.00

#### For Your Nearest Distributor

FOI	Tour Nearest	Distributor
VIC.	South Yarra	241 3031
	Box Hill	288 3611
	Mildura	(050) 236272
	Gippsland	(051) 45 4315
NSW	Fairfield	(02) 72 0245
WA	West Perth	(09) 322 2070
	Claremont	(09) 384 8431
ACT	Belconnen	(062) 51 2525
QLD	Maroochydore	(071) 43 4292
	Gladstone	( )
SA	Nth Adelaide	(08) 23 9029

NOTE — ATLANTIS IS NOW USING 4 LAYER BOARDS

#### **NETWORKS**

emulator or any other communications cards, whether asynchronous, SDLC (synchronous data link control), BSC (bysynchronous communications) or PC Network. The second block of switches allows you to fit a second back-up Token Ring network adaptor card in either an XT or AT.

Once the card is installed you need to connect it up to an 8228 multiple access unit costing \$1388. This is a small, rugged box-like affair, 48.3 cms wide, 6.7 cms high and 20 cms deep. It has a flip-top front panel and cable-guides on either side. The 8228 is the linchpin in the Token Ring network.

There are 10 identical sockets arranged in a row hidden away behind the front panel. Each is linked to the other internally by set 'intelligent' relays. Externally, eight of the sockets connect directly to PCs while the other two, labelled RI (Ring In) and RO (Ring Out), connect up to other 8228 units to form a closed loop. On a large network the overall impression would be a ring of 8228s with PCs radiating out from each 8228 like spokes in a wheel. This is known as a star-wired ring.

The cabling used to connect PCs to the 8228, and 8228s to each other, varies depending upon the distance information has to travel and the number of stations to be installed. On the system tested by us, IBM type-6 cable was used. This is two sets of twisted-pair cable — one for receiving information and the other for sending it.PCs can be located up to 120 metres from the 8228 and up to 33 8228s can be located 45 metres from each other.

For larger installations IBM suggests an alternative and much more expensive cabling scheme. Here buildings are prewired using IBM-type-1 cabling with wall sockets for individual PCs and with the cabling behind the walls gathered up into wiring closets in which 8228s are stacked in eight rows of eight. The closets themselves may then be attached by a single connection.

Using this scheme a total of 264 PCs can be connected, with PCs located up to 100 metres from the nearest wiring closet. The closets themselves can be located within 200 metres of each other. Using cheaper type-3 cable, the figures drop to 72 stations on the ring with PCs located within 45 metres of the appropriate closet and with closets less than 120 metres apart.

Once you have decided on the size of the ring you want and have connected the various bits and pieces of hardware and cable together, the next step is to switch the network 'on'. This is done by running a special network interface program on each station. It is supplied on disk and may be copied onto hard disk and run directly by issuing the command TOKREUI from a batch file. The program first checks that the adaptor in your workstation is working and then sends a 5-volt current down the cable to the 8228, which audibly clicks as the connection onto the ring is opened up. The process takes some 45 seconds and requires no operator intervention.

Once the workstation is physically locked on to the ring the next step is to load IBM's Netbios system, also supplied on disk. This is the software that makes the network compatible with PCDOS and takes care of the interception of network requests and their routing to the appropriate workstation.

Our final step in getting the network up and running was to load IBM's PC Network program. This provides a user interface to the network and is used to determine which of the workstations would act as a concurrent file server and exactly which resources would be shared, and by whom. After this we were able to run a number of applications including Lotus 1-2-3, DisplayWrite III, and WordStar. With the exception of Lotus, which required a copy-protected system disk and was not multi-user, the programs were loaded directly from the file server's hard disk and ran on the multiple stations without problems sharing data.

Satisfied that the Token Ring worked, we turned our attention to its performance. The best throughput was achieved by configuring the system so that information was passed down the lines via Netbios in 16k chunks. Here there was a performance of 800kb/s which compared favourably with similar tests carried out on a more expensive Ethernet-based LAN with a raw bit rate of 10Mb/s, and a throughput when similarly configured of 1Mb/s.

Throughput figures remained stable and did not tend to fluctuate as activity levels varied between workstations. This provided a clear indication that the theory behind token-passing protocols was indeed working in practice.

A traditional weakness of ring LANs is that if one station goes down then the whole ring collapses, as each workstation effectively acts as a repeater, retransmitting the token and any attached data to its immediate neighbour. This situation is compounded by the fact that the only way to diagnose which station is faulty is to test each link in the chain individually. It is rather like wiring up a Christmas tree with fairy lights; if just one light is faulty none will light up.

IBM has neatly sidestepped these pro-

## **FMS**

Distributors for Lattice Incorporated, Phoenix Computer Products, Media Cybernetics Tools for the Professional

#### \*NEW\*Lattice C Version 3.1

\$890

The famous professional C compiler with 4 memory models is now ANSI standard. This release includes in-line 8087 and many UNIX compatible functions as well as smaller, faster code. Lattice upgrade \$150

Lattice dbCII,dBCIII \$446 dBase II or dBase III compatible data base module to produce dBase com-

base module to produce dBase compatible databases of course.

Lattice LMK \$250

Don't forget to re-compile dependent

Don't forget to re-compile dependent code after a change. Let the computer work out what to do next. Identical to UNIX MAKE. Uses time and date to determine batch files from a simple list of dependencies. Just edit a module and walk away!

#### C Cross Reference Generator

\$202

#### Multi-Halo \$630

The ultimate PC graphics interface. 132 drivers for cards, printers, digitizers, mice and now plotter output. Many graphics modes supported on graphics boards. Three types of text. Functions from fine line to polygonal flood, World co-ordinates and clipping. Specify language. Basic interface handles interpreter and compiler.

Multi-Halo All Languages \$1350
As above with 24 discs covering interface to 12 languages. The all languages, all hardware monster. Microsoft C, Fortran, Pascal, CI-86, Mark Williams, Aztec, Turbo Pascal, IBM Basic Interpreter, Compiler...

Bastoc (Basic to C!) \$1018
Why waste time converting by hand.
Excellent robust and configurable translations. Imbeds your original comments. Turns GOSUBS into functions. Drops unused line numbers, turns the rest into labels. Versions available for Microsoft Basic and C Basic.

EMACS \$786
The famous UNIX EMACS multi window multi file editor on a PC.







Available in Australia from

#### FAGAN MICROPROCESSOR SYSTEMS

95 Canterbury Road, Middle Park, Vic. 3206 Tel: (03) 699 9899 Telex AA31604

FREE catalog. Call or write



Le Modem, from Imagineering, is designed especially for the PC user who needs to access bulletin boards, videotext services such as Telecom's Viatel, and commercial data bases operating at lower baud rates — without taking up precious desk space.

This well-proven and popular modem incorporates the following features and benefits:

- \* Elimination of acoustic interference and data corruption.
- \* Auto dial, auto answer, auto disconnect.
- \* Industry standard "AT" command compatibility.
- Australian Standard (CCITT) V21 or V23 and Bell 103.
- \* AUSTPAC compatible.
- \* Pulse and tone dialling.
- \* Compact design.
- \* Speaker

- \* IBM PC COM1/COM2 compatible.
- \* Automatically "speed converts" and split baud rates.
- \* Optional phone handset.
- \* Telecom approved.

For further information please contact: MYER COMPUTER AND BUSINESS CENTRE, Melbourne — (03) 661 3342, Brisbane — (07) 378 5111, Adelaide — (08) 217 0123, Sydney — (02) 238 9450, Perth — (09) 481 1600,

SELECTED COMPUTERLAND BUSINESS CENTRES.

OR contact Robert Sarafov at Imagineering SYDNEY - 662 4499.

Le Modeni



IMAGINEERING 💅

#### **NETWORKS**

blems by opting to star-wire PCs in batches of eight around 8228 multiple access units instead of simply linking each one to the next, and by organising workstations in such a way that each monitors the operation of its immediate neighbours.

Each Token Ring adaptor card has its own unique identity number. When a PC is first connected up to the ring this is transmitted to its immediate neighbour. If the PC either fails to transmit a signal for a set period of time or when its signal is distorted, its neighbour then broadcasts this fact, along with the faulty PC's identification number, down the ring. It is passed from one workstation to the next until it reaches the offending PC. This reads the message, realises that it's not functioning properly and breaks the connection between itself and the 8228. The faulty PC then goes into self-test while other workstations remain connected via the 8228 and continue to function normally.

With faulty workstations automatically popping in and out of the ring, token integrity becomes a problem. On IBM's ring this is resolved by monitoring the Token itself as it goes round the ring. The token's passage is timed. If no token appears within the maximum length of time required to complete one circuit of the ring, it is assumed lost. In this case a new token is then automatically generated. Also, if a busy token completes more than a single circuit of the ring it is automatically 'freed'.

Like most of IBM's hardware, Token Ring is supplied with a set of diagnostic routines on disk. Intended to give you sufficient information to pass onto IBM's engineers, the routines are menu-driven and require a minimum of operator intervention. They first check to see what primary and alternative adaptors are installed and then perform multiple tests to determine the source of the error (for example whether the PC itself, the network adaptor card or the adaptor interface software is at fault).

The results of diagnostic tests appear, for the most part, in hex and take the form of a mini-report which can be logged and printed out. The report begins with the adaptor's unique identification number (12 digits) and gives further information relating to ROM addresses, code and interrupt levels. These are determined by the DIP setting switches on the card. Status and error messages comprising a terse message plus a 5-digit code make up the rest of the report.

These reports, which give information about the location of faulty workstations on the LAN, could well prove a godsend

#### TOKEN RING PRICE LIST

Description	Price
Hardware	
8228 Multistation Access Unit	\$1388
Network Adaptor Card	\$1338
Network Adaptor Card	Ψ1330
Cabling	
8-foot Network Adaptor Cable	\$87
Software (per station)	
Netbios program	\$71
PC Network program	\$143
Enhanced PC Network	
(LAN) program	\$238
IBM Token Ring Network	
Manager	\$2978
PC DOS 3.2	\$196
10000.	

#### THIRD-PARTY COMPATIBLE PRODUCTS

#### 3 Com

Token Ring interface for 3 Com Server, adaptor board and 3+ Networking Software

#### Corvus

Gateway to OmniNet

Manufacturer: IBM

#### Nestar

Token Ring interface for Plan series of file servers

#### Novell

Advanced Netware for Token Ring and Software Bridge to run Netware compatible application on any other network supporting Netware

to experienced network managers overseeing large installations but are unlikely to help the inexperienced.

#### Conclusion

Overall IBM's Token Ring is a simple scheme that combines the benefits of both star and ring topologies. On the one hand, token passing provides a reliable and ordered way of transmitting informa tion between workstations where response times are constant, and are determined only by the number of workstations installed and not by the level of activity. As implemented by IBM it ensures a relatively high level of throughput (approximately 800 kilobytes per second) suitable for running most office automation applications despite much lower raw bit rates (4 megabytes per second) than standard

## **FMS**

Distributors for Lattice Incorporated, Phoenix Computer Products, Media Cybernetics Tools for the Professional

Btrieve

\$617

The most popular B-Tree product available. Easy to use. Keeps all the keys in one file. The one copy interfaces with all the popular languages.

Btrieve/N

\$1145

Btrieve with record locking for the Novell, 3-COM and Ethernet networks. Network specific. Specify network with order.

Rtrieve \$240 Rtrieve/N \$408 Add on for Xtrieve. Specialized reporting.

Xtrieve \$416 Xtrieve/N \$822
Report generator module for Btrieve.

Essential C \$378 Graphics, DOS, Windows in source. A

great place to start. No royalties.

Essential Graphics \$378

Source Graphics Library. CGA, EGA, Hercules boards, multiple fonts. IBM, Epson and Microline printers. No royalties. Fundamental graphics for the base PC market.

Panel \$732

Why write data entry and validation code? Panel will produce source code for you. Available for all languages and operating systems. One of the very best programmer efficiency tools. Specify language.

Greenleaf C Functions \$404
Why reprogram the wheel? Try this documented debugged Royalty free source. Functions cover DOS, String, RS232C largely for the IBM PC. No royalty. Many functions are in assembler for speed but are pre-compiled

**Greenleaf Communications** 

for convenience.

\$397

Source. All functions for multiple simultaneous transfers through an arbitrary number of ports at up to 9600 baud without using data, using ring-buffered interrupt-driver protocols. Also supports XMODEM protocol and Hayes-compatible commands.







Available in Australia from

#### FAGAN MICHOPROCESSOR SYSTEMS

95 Canterbury Road, Middle Park, Vic. 3206 Tel: (03) 699 9899 Telex AA31604

FREE catalog. Call or write

Micron Computers (Au (Buy Direct from the IMPORTER and SAVE!!) (Australia)

75 Irving Street Footscray 3011

SPECIALISTS IN SYSTEMS FOR OFFICE, SCHOOLS AND HOME 631 Glenhuntly Road South Caulfield FINEST IBM COMPATABLE SYSTEMS

Phone: 689 6444 (3 lines) Fax: 689 6190

\*\* \* ALL SYSTEMS WITH 12 MONTH WARRANTY \*\*

Phone (03) 528 6692

**★★★ ALL JAPANESE COMPONENTS ★★★** 



COLOUR SAKATA 13" \$582 TAXAN V-III \$825 TAXAN V-IV \$1216

MONOCHR. MICRON COMPOSITE GREEN-AMBER \$245

MICRON TIL. **GREEN-AMBER** \$255

\$3900

**S334** 

**S200** 

**S15** 

\$200

\$220

\$75

\$25

\$150

**\$220** 

**S522** 

US

NOW

#### MICRON PC/XT (Package Deal)

- 640K RAM ON MOTHERBOARD
- 8088 PROCESSOR (Optional V20-5 processor)
- PROVISION FOR 8087 CO-PROCESSOR
- 8 EXPANSION SLOTS
- 2 360K DOUBLE SIDED NATIONAL DISK DRIVES
- CENTRONICS PARALLEL, SERIAL (second optional), GAMES PORTS
- REAL TIME CLOCK CALENDAR, BATTERY BACK-UP
- AT STYLE KEYBOARD
- 150 WATT POWER SUPPLY
- MONITOR ON TILT SWIVEL BASE
- FULL 12 MONTH WARRANTY ON PARTS/LABOUR

\$1550

#### SPECI 51/4"DISKS 5500 **GOLD HUB** \$16 BOX OF 10 DISKS OW, THAT'S

#### MICRON AT

- 80286-2 MAIN PROCESSOR (optional 80286-7 co-processor)
  - 1024K RAM ON MOTHERBOARD
- 1x1.2 MEG FLOPPY
- 1x20 MEG HARD DISK
- FLOPPY DISK, HARD DISK, TAPE DRIVE CONTROLLER
- LIGHT PEN PORT
- 200 WATT POWER SUPPLY
- AT KEYBOARD

**MULTIFUNCTION CARD 384K** 

150W POWER SUPPLY

**MULTI IO CARD** CABLE FOR ABOVE

- KEYBOARD LOCK
- COLOR (RGB/Composite), MONO COMPOSITE DISPLAY
- PARALLEL, SERIAL (second serial optional) GAMES PORTS
- FULL 12 MONTHS WARRANTY ON PARTS/LABOUR

INTERFACE FOR IBM OR COMPATIBLES

#### **PRINTERS**

**EPSON LX80 GEMINI 15"** \$484 \$720 **SUPER 5 1201** \$547 **SUPER 5 1000 OLYMPIA NP165** \$500 \$495 **CANNON 1080A EPSON LX86** \$565 \$519 RIBBON FOR LX80-86 \$13.50 **RIBBON FOR 1201-1000** 

DISK STORAGE HOLDS 100 DISKS \$25.00

20 MEG HARD DISK WICONTROLLER \$955

IBM DISK DRIVE JOY STICK PRINTER CABLE REPLACEMENT KEYBOARD REPLACEMENT KEYBOARD AT TYPE

**EPROM PROGRAMMER** \$165 **COPY CARD & SOFTWARE \$175** ZNIX MOUSE & SOFTWARE \$140

WE STOCK MANY REFERENCE MANUALS **\$CALL US** 

MAIL ORDER NOW! Call direct! Call today! \*DELIVERY AUSTRALIA WIDE

#### TUTORIAL CLASSES

EXTENDED GRAPHIC CARD

- FOR WORDSTAR 2000 BEGIN IN NOVEMBER
- 6 HOUR CLASS (OVER 3 NIGHTS) = \$145 CALL
- FOR INFORMATION ON OTHER CLASSES

\* All Prices Include Sales Tax

Ethernet-based LANs (10 Mb/s).

On the other hand, by star-wiring its LAN with a single cable, IBM has struck a fine balance between the use of dedicated lines for network control and shared lines for cheaper installation costs. It manages to incorporate a power set of autonomous facilities for detecting and correcting transmission errors.

Although Token Ring, with dedicated lines linking PCs to 8228s and its need to close the loop where more than one 8228 is in use, will require more cabling than your average Ethernet-type bus network, the extra has been kept to a minimum.

On the software side, Token Ring's dependence upon Netbios and IBM,'s PC Network Program is a mixed blessing. Using Netbios does have the advantage that Token Ring is PC Network compatible and that all programs that ran on the latter will run on the former. Also, because the Token Ring adaptor card has been designed to support an alternative IBM networking/communication card and Netbios supports communications between 'linked' stations running multiple applications off multiple adaptors, existing PC Network users will benefit from an upgrade path that does not render their existing investment in IBM LAN hardware obsolete.

However, the disadvantages of Netbios are that, while it supports 3270 emulation, it is at present incompatible with IBM's SNA architecture which provides a much more flexible entry point into the IBM mainframe world. Also, the way in which Netbios requires devices on the LAN to broadcast their presence makes it unsuitable for networking.

As for IBM's PC Network program, despite being good value at \$143 per terminal, it is not suitable for large or secure installations. Password protection and access permissions are limited and the program only recognises different devices and not users. Fortunately IBM intends to release an enhanced version of the PC Network Program (\$238) as well as a full network management package (\$2978) which is udnerstood to be on a par with Novell's Advanced Network package that currently sets the standard in LAN management software.

A table of networking products with specifications will appear in the December issue of APC.

Incorporated, Phoenix Computer **Products, Media Cybernetics** 

Tools for the Professional

\$499 Version 4 is available for PC and non-PC users. PC users get the famous Pmate full screen macro editor, a menu driven editor, a multi-tasking editor, a FORTRAN and C checking editor all in one package.

\$690 Overlay linker for C, Pascal, Fortran, PL/1, Cobol. Define overlays at link time and not in the program. Includes Plib86 library manager.

\*NEW\*PLINK86 Plus \$867
The ultimate linker. Allows production of code for bank switched memory past 640Kbyte. Automatic overlay handling.

Pfinish Profile your code and find bottle-necks. Can use symbol table from Plink to give hit counts on routines as well as Monte Carlo report.

\$499 Multi-window debugger. Shows stack, CPU, 8087, File, Breakpoints, in Shows separate windows. A delight to use.

The most comprehensive and powerful symbolic debugger available. Multi-window screen which flips onto the application screen. Extraordinarily customizable. Up to 100 step trace back! Global breakpoints on memory address references! Don't waste another second with Debug!

Phoenix equivalent of the UNIX LINT function. Checks for portability of C. Locates incorrect, obsolete and non portable 'C' usages that no compiler would catch. Code.

ForCe The most comprehensive C library Over 400 available. programs. Excellent documentation, demos, step by step explanations. Two full manuals. Windows, B-tree, Dos, Comms, string handling, Date and time...On-line help and reference







Available in Australia from

#### FAGAN MICROPROCESSOR SYSTEMS

95 Canterbury Road, Middle Park, Vic. 3206 Tel: (03) 699 9899 Telex AA31604 FREE catalog. Call or write

#### THE GREAT dBASE SWITCH!

dB COMPILER for dBASE II or dBIII COMPILER for dBASE III can run your dBASE programs 3 to 10 times faster, running on CP/M-80, CP/M-86, PC-DOS and all MS-DOS machines.

The dB Compilers offer these outstanding features:

- ★ Ease of use
- Portability of code
- ★ Independence from dBASE III and RUN TIME +
- Protection of source code
- Excellent program debugging
- Substantial speed improvements
- ★ Freedom from licence fees
- Automatic memory management when linking
- ★ DOS interrupts and other new features

Demonstration compiler available for evaluation. MDMS will provide free technical support to all registered users.

Call The Australian Distributor.

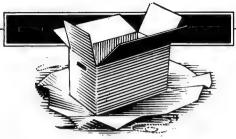
#### MICRO DATA MANAGEMENT SYSTEMS

Phone: (02) 745 1995

- 1,2 Trademarks of Ashton-Tate Inc.
  3,4 Trademarks of Digital Research Inc.
  5 Trademarks of International Business Machines, Inc.
  6 Trademarks of Microsoft Inc.







## WHAT'S NEW

Ian Davies checks out the most interesting new micro products announced over the last month.

#### Microcomputers



AT-S from UNI-X
This AT compatible boasts
1 Mbyte of RAM on the

motherboard, a dual speed 80286 processor and a system reset button on the front panel. One of its main features is the small footprint, as the system only occupies about as much desk space as an XT.

With a 20Mbyte hard disk, the AT-S sells for around \$5,300. With the addition of a colour monitor and CGA/MDA/EGA card, the price goes up to just under \$7000.

For more information, call UNI-X on (07) 356 7866.

#### More VoiceWriters

Following on from last month's report on the Kurzweil VoiceTerminal, an American company called Microphonics Technology has introduced its own VOX/COM PC.

This machine would appear to be very similar to the Kurzweil job. It is an XT compatible with a 20Mbyte hard disk and modem. Unlike the Kurzweil offering, Microphonics is long in describing its PC type features and modem

capabilities, but very short on its ability to understand a spoken voice.

It does say, however, that it utilises the Pronounce voice control system which gives you the ability to control MS-DOS software using spoken commands.

In the next few months, or certainly within a couple of years, IBM will probably come out with one of these devices. Then we'll really have something to talk about.

#### 80386 LISP Board

Not yet available in Australia, the Gold Hill Computer Company has released an 80386 based enhancement board for PCs, XTs, ATs and compatibles which runs the Golden Common LISP development system.

The board, called the 386 HummingBoard, runs GCLISP five times faster than an AT. The 80386 is driven at 16MHz and may be supplemented by up to 24Mbytes of 32 bit memory. A 2k high speed cache boosts processor performance, as does multibuffered nonsuspensive I/O which allows the processor to continue running while I/O is taking place.

The board costs \$US7000, which is about twice the price of an AT over there.

#### **Porchester Turbos**

Porchester Computers has announced the availability of two Turbo boards for IBM PCs, XTs and compatibles.

The TinyTurbo 286 contains a high speed 80286 processor which outperforms the IBM AT and can be located in a half

sized expansion slot. The TurboEGA provides the same accelerator, but also includes an EGA compatible display adaptor. The adaptor is also said to be compatible with CGA, MDA and Hercules standards.

Porchester is on (03) 537 2722.



#### **New Beeb**

Barson Computers has launched the BBC Compact, a slimmer yet more powerful version of the popular BBC which now sports a lower price tag. The Compact includes a standard numeric keypad, 128k RAM and bundled software. For \$1332, you get all this plus a disk drive, WIMPs software, word processor, database, note pad, tutorial, games, Basic and printer interface.

For network environments, a \$970 version of the Compact is also available without the disk drive. To this, the \$85 Econet software may be added. Other options include an RS-232C interface.

Barson Computers may be contacted on (03) 419 3033.

#### More AT Compatibles

Another month has passed with the list of AT compatibles growing with the voracity of mould on the bathroom wall.

Each of these machines offers unparalleled price/performance, unique features, brand name recog-

nition, high performance and 100 per cent compatibility.

This months list includes the Tandy 3000, Osborne AT, Osborne AT Turbo, A\*Star II from KCM, Televideo TeleCat, Dick Smith Multitech PC/900 and the Zenith AT.

#### Software

#### **Pascal Utilities**

Microway has secured distribution rights for a range of Pascal utilities and productivity aids. Turbo Professional is a suite of utilities for Turbo Pascal developers which includes features such as keyboard macros, DOS Delivery \$5.00 GOSFORD \$10.00 WOLLONGONG ANYWHERE ELSE

### C PLUS MICROS

319 PACIFIC HIGHWAY NORTH SYDNEY N.S.W. 2060 P.O. BOX 295, PADSTOW, NSW 2211 SYDNEY (02) 929 6444 MELBOURNE (03) 877 7711



KINGTECH PORTABLE

MODEL AK-GC20 JOYSTICK \$45

for 2+/2c/2e or IBM

#### A new force in the world of portables



Ampere WS-1 An A.P.L. Computer from \$3999

- 16/32 Bit 68000 CPU
- 1 Parallel Port
- Up to 512k RAM Built in Modem 2 Serial Ports
- 25 x 80 LCD screen OCTAGON — Eight

Application programs in ROM

#### IBM ACCESSORIES

Parallel Printer Cables	\$30
Teac Disk Drive	\$250
384k Multifunction Card (O.K.)	\$276
EGA card	\$615
135 Watt Power Supply	\$200
Metal Case	\$100

#### AD-DA CARDS

2	Bit A-D	16CH D-A	2CH	\$270
4	Bit A-D	16CH D-A	1CH	\$360

#### APPLE ACCESSORIES

Liquid Crystal Display for 2C	\$599
Clip on cooling fan	\$59
Grappler card & cable	\$65
Expanded 80 col 2e	\$70
128k RAM	\$180
Eprom Burner	\$65
16k RAM	\$50
Buffer card & cable	\$100
SAM speach card	\$36
Super 5 Teac Disc Drives	\$280
Z-80 Cards	\$60

#### DISKETTES

DIGIELLE	
5¼ CIS DSDD (for A.T.'s) 96TPI	\$60
5¼ CIS DSDD	\$24
5¼ XIDEX DSDD	\$36
3½ CIS DSDD (135TPI)	\$54

#### **Introducing the Sortec Portable Laptop**

\$3600

with TTL

16kg

640k

Serial

Clock

Parallel

2 FDD's • 20 Meg HDD

Monitor

\$3600 Dealer Enquiries Welcome

#### **PHC-16**

- 80C88 4.8MHz 16 bits CPU
- 512k on board up to 1.25M bytes
- Large LCD display: 640 x 200 for graphics + Back Light 80 columns x 25 rows Standard ASCII layout keyboard, 10 function keys
- Infrared wireless keyboard
- 5.25" floppy drive 360k 3.5" available soon Built-in: parallel printer port, RS-232C port, clock Video port for RGB and MONO monitor
- DC 12V rechargeable battery included Compatible C-CP/M, PC-DOS & MS-DOS
- 14 lbs. (6 kgs.)
- Concurrent CP/M standard
- External dimensions 330 x 153 x 265mm
- 360k RAM disk
- Carrying Case
- Gas light and inbuilt 20MG hard disk available

#### **EXPANSION CHASSIS**

#### Versatile Expansion Chassis for IBM PC/XT

- 5 PC/XT Expansion Slots
  100 watt power supply
- Send/Receive Adaptors/Cable

**\$630** 

Streaming tape extra



#### VISUAL INTELLIGENT TERMINAL

Automatic Consecutive Mark Card Reader QUARAPID-3

For data input and calculation of school test results, polls, office rationalization, or any counting procedures.

Features: Built in RS232c interface for connection with



Prices are subject to change without notice



- Extremely easy to learn and use
- Data is interchangeable with all modules and other products
- Multiple Windows allow quick movement between tasks
- Four background, one foreground mode. Can print on two printers or plotters and two communication devices (modem and main-frame direct connection) all at the same time.
- Artificial Intelligence features reduce the number of keystrokes required to perform tasks
- Upgradable software and data to UNIX and XENIX
- Colourful graphic representations

- Package contains: one plastic box, one illustrated reference manual, one program disk, one sample diskette, keycaps and user support plan
- System Requirements: IBM PC or compatibles, 512K, two 360K diskette drives, color or mono display

#### DEALER ENQUIRIES WELCOME

"I can safely say that I have yet to come across a package which demonstrates such functionality combined with such an innovative approach to the man-machine interface. ABLE are to be congratulated on producing a product which achieves a very high standard of excellence."

- Michael D. Bowe, DATA GENERAL

"The best multi-purpose product I have evaluated. Multi-tasking works great, able to print, make an on-line connection and edit a document at the same time.

Robert Lawrence, ITT INFORMATION SYSTEMS



#### WHAT'S NEW

program execution, concurrent printing, resident programs, pop-up menus and interrupt service routines, Turbo Professional is priced at \$196 plus sales

Other products include Turbo Extender, TurboPower

Utilities, and Alice, Alice is a syntax directed editor which uses a 'fill in the blanks' approach to program entry and editing. Alice includes a debugging interpreter.

Microway is on (03) 555 4544.

Carousel allows up to 10 application programs to be loaded simultaneously, with applications other than the current one being paged out to disk. Double Dos is a utility which allows two

applications to reside in memory and execute at the same time.

All of these utilities are priced at \$99, plus tax.

SNS is on (02) 958 2399.

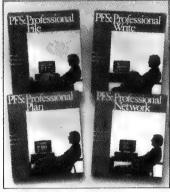
#### Prime Macintoshes

Users can now integrate Apple Macintosh micros and Prime minicomputers through a new communications product from Prime.

Primelink, previously available for IBM PCs, has now been ported to the Mac. This software allows Mac users to access Primos files and issue Primos commands, as well as transfer files

between the two. Additionally, a virtual disk facility is included which enables Mac files to reside on the central machine. Primelink also provides PT200 terminal emulation and allows Primos files to be printed on the Imagewriter and Laserwriter printers.

More information is available from Prime Computer. on (02) 929 0044.



#### More from Software **Publishing**

The Software Publishing Corporation, of pfs:FILE fame, has announced a variety of new and enhanced products.

The Professional Series software products now provide network support

through the IBM, Novell and 3Com networks. In an interesting marketing approach, the product may be used by only one user at a time through these networks. However, if you buy the Professional Network product, up to five users may run the Professional Series package at the same time. The network will be available in December at a cost of \$845.

The Professional Series of software includes Professional File, Write and Plan. A new product, pfs: First Choice is an integrated word processor, spelling checker and filing system with reporting, spreadsheet analysis and communications. It is aimed at the first time user with extensive help and jargonfree screens. See a test elsewhere in this issue.

#### Multi-User MS-DOS

SPS Software Product Support has secured distribution rights for the PC-MOS/386 operating system produced by The Software Link.

PC-MOS/386 is an MS-DOS compatible operating system specifically designed to take full advantage of the 80386 processor, including multi-user support. SPS says that PC-MOS/386 offers more than MS-DOS version 5 is likely to offer because of Microsoft's Xenix involvement and its relationship with IBM.

The operating system will be completely independent of MS-DOS and offers record and file locking, intertask communication, print spooling, remote access, usage statistics and security. It is expected to be available in February, 1987, although some components have already been demonstrated to 80386 vendors.

SPS may be contacted on (02) 419 5879.

### Personnel System

Infolink Software has released a new human resources management and accounting system which will enable managers to maintain complete employee records on an IBM PC. The system, called Stahr, is designed for companies with between 200 and 1000 employees.

The system, developed in Australia and based on the Data Ease DBMS, provides

functions for vacancies, sick leave, vacation, entitlements, award rules, training and employee history. A position management facility keeps track of the various positions within an organisation, and allows for their maintenance.

The system runs on IBM PCs and compatibles, and costs around \$20,000. including a basic machine. Infolink is on (02)

438 3033.

#### Peripherals



Data Logger

An Australian designed and manufactured data logger, known as the Datataker, has achieved major success in

the world market. The Datataker is a programmable data acquisition device with 24k of memory, 54 channels, analogue and digital capability and a host of statistical functions. It can be interfaced to any computer with ASCII communications.

The Datataker is being used by Nasa, Bell Telephone, Volvo, General Motors, the Danish Atomic Energy Commission, and even Australian Telecom.

More information from Data Electronics Australia, (03) 221 1277.

#### Softlogic Utilities

SNS Leading Edge has secured distribution rights for the Softlogic Solutions suite of utilities.

Disk Optimiser reorganises hard disks by consolidating

fragmented files and grouping free spaces, thereby providing enhanced disk access speed. Cubit is a utility which performs automatic data compression on selected files.

#### **FAX Security**

Claiming that anyone with a normal tape recorder can tap into a telephone line, record a fax data stream and later

play it back into their own fax machine, Visionhire has announced the availability of the first fax encryptor.

Saying that facsimile security has never really



#### **SKAI AT-286 The Ultimate Performer**

Enter the speed demon. A blend of features and performance that take the Skai AT-286 beyond just being another IBM Personal Computer AT compatible.

#### Performance

If you're looking for a business computer that gives you a competitive edge, take a look at this powerful machine.

The Skai AT-286 uses the new Intel 80286-4 microprocessor, an improved version of the same type originally used in the IBM PC/AT. This means you can switch the computer into TURBO mode for uncompromising performance. Extra speed is also valuable if you're working in a scientific, math, or engineering environment,

and it's yours simply by adding an 80287-8 coprocessor.

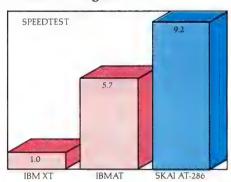
#### **Features**

Check out some of the Skai AT-286's other superior features. Like the built in 1.2M Byte floppy, Printer and serial ports, clock and hard disk drives available from 20M byte to 160M byte. Standard RAM capacity of 640-Kbytes. And you get plenty of expandability with six IBM PC/AT compatible slots and two IBM PC compatible slots.

#### Warranty

The Skai AT-286 is fully imported from Japan and has full Fcc-UL approval. Basically this means that the Skai is such good quality that we're willing to back it with a full 12 months warranty.

#### Norton SI Program V3.0



SI Test shows speed relative to the XT.



Australian Distributor:



Porchester Computers Pty. Ltd. 177 Barkly St., St. Kilda, 3182. Telephone: (03) 537 2722

For more information and your nearest dealer Phone: Toll free 008 33 4854

SKAI Range of quality computer products includes SKAI XT-turbo, EGA Monitors and a range of over 40 SKAI add on cards for the following: Video, Multifunction, Memory Expansion, Disk/Tape Controllers, Engineering development boards and High speed add on Processors.

### ARE YOU STILL IN THE DARK?



**ENLIGHTEN YOUR** PC/XT/AT OR **COMPATIBLE SYSTEM** WITH

## mitac

**EXPANSION BOARDS** HARD DISKS ETC. AT BETTER PRICES



- Mono/Graphics/Printer with or without serial
- Color/Graphics standard & E.G.A.
- RAM
- Multi Function
- Hard disks for PC, XT and AT
- I/O Boards

Ask your PC Dealer

**DEALER ENQUIRIES TO:** 

PUTHINK

11 Hamlet Street, Cheltenham (03) 584 3188



#### WHAT'S NEW

been considered. Visionhire expects many banks, brokers and other organisations involved in confidential communications to make use of the encryptor. The

device is already being used by Customs and the Tax Office.

More information is available on (02) 959 5600.

includes 256k RAM and 160k of floppy disk storage. but may be expanded with a 40Mbvte hard disk. Offcom is on (02) 438 4199.

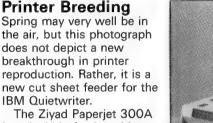


Cheaper Cables Everyone knows how shockingly expensive computer cables are. Even the

most humble printer or serial cable usually sells for between \$50 and \$80.

Logo Computers has introduced a new range of extremely cheap, high quality cables. Prices go as low as \$6.50 for very large quantities, with one-off cables costing around \$25.

Logo has cables for most parallel and serial applications, and can be reached on (02) 819 6811.



is a dual bin feeder with envelope capability. One of its most distinguishing features is the ability to remember the address printed on a letter and automatically prepare the envelope and collate the envelope with the letter. The Paperjet 300A has capacity for up to 200 sheets and 70



envelopes, and is compatible with most major word processing software.

More information is available from Viva Computer Supplies, on (02) 908 4076.



PC Tape System Alloy Australia has

announced a 9 track tape system for PCs. PC-9TRACK includes an intelligent 0.5in tape drive, interface card,

cables and software. The drive itself features a built-in take-up reel and is self loading.

This device allows corporate users to more accurately and easily transfer information between personal computers and mainframes. The tape system records at 1600 BPI with a transfer speed of 700k per minute. This provides a capacity of 42Mbyte per tape.

The PC-9TRACK costs \$12,750, excluding tax. Alloy is on (03) 561 4988.

#### Line Analyser

Electromark has announced the availability of the OLA-7611 online protocol analyser from TOA Electronics.

The unit includes three 16 bit CPUs and a 500k floppy disk, and is capable of level 2 and level 3 interpretation at up to 64kbps full duplex in real time. The device

supports RS-232C, RS-423, RS-422 and TTL interfaces and can analyse X25, HDLC, SDLC, BSC, SYNC, ASYNC and transparent protocols. Data codes may be interpreted in ASCII, JIS7, JIS8, EBCDIC or HEX.

More information is available on (02) 570 7287.



Aussie ToSBox

Offcom, an Australian communications company, has announced an office communications manager named ToSBox. Currently being released in Australia. and later in North America and Europe, the box is an IBM PC compatible microcomputer specifically geared to office communications.

Including a built-in display, keyboard and printer, the ToSBox is an intelligent telex machine replacement in its most lowly configuration. Using automatic queueing, retry, offline preparation and archiving, the box is claimed to reduce telex costs by 50 per cent for domestic traffic and 41 per cent for international. Offcom claims that one ToSBox provides the capacity of three normal telex machines.

Enhancements include the ability for direct office-tooffice communication, LAN support for office automation and connection to IBM mainframes through an IRMA board. The system

#### Overseas

#### Motorola news

A confirmed leak from Motorola has broken the

news that the company will release two new processor chips next year.

#### **八ATARI 1040 ST** 1 MEGABYTE POWER

## 小ATARI 520 ST

WIDE RANGE OF HARDWARE: SOFTWARE ACCESSORIES, BOOKS & SUPPLIES AVAILABLE.

#### SPECIALISING DEALER

AUSTRALIA WIDE DELIVERY



NORTH SYDNEY Tower Square

155 Miller Street (02) 957 4690

#### BANKSTOWN

Cnr. Appian Way & North Terrace (02) 708 5843

## OFSE MICROLINE PRINTERS

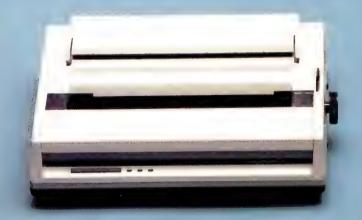
PRICE

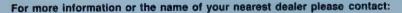
PERFORMANCE

RANGE VERSATILITY

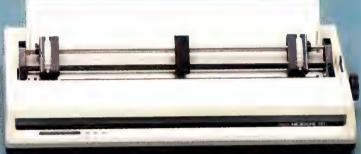














- \* Colour graphics \* 120, 160, 200, 400 CPS \* 9 or 18 pin printhead

- \* High duty cycles \* Tractor, pin or friction feed \* Bottom feed
- \* Push tractor/tear bar
- \* Excellent paper handling



SYDNEY: 79-81 Regent St. Redfern 2016 (02) 698 8211

25 Palmerstone Cres. Sth Melbourne 3205 (03) 690 9855



'Excellence, Quality, and Profit' is our management policy. Our R&Dengineers are constantly creating new products to help you penetrate your markets. We produce high quality IBM PCTC/AT compatibles, main boards, and a whole range of add-on cards. All at competitive prices. What's more, our prompt delivery and satisfactory after-sales service will never let you down.

For the best choice, contact us now!



#### FTC 3200 AT

- Intel 80286-8 CPU, 32K AMI legal BIOS.
- Socket for optional 80287 match coprocessor.
- 6/8/10 MHZ by software and hardware
- 1/4 MB RAM on board (41256/1MB DRAM)
- 2 floppy drives (1.2MB or 360KB). Mono/Graphic/Printer or Color/Graphic/ Printer
- 200W power supply.
- 20MB or 40MB hard disk can be fitted.
- Operating system: MS DOS 3.1.



#### FTC 3200 AT SMART TYPE

- VLSI chip/super mini.
- \* Intel 80286-8 CPU, 32K AMI legal BIOS.
- \* Socket for optional 80287 match coprocessor
- \* 6/8 MHZ by software and hardware switchable
- 512K/IMB RAM on board.
- 2 floppy drives (1.2MB or 360KB). Mono/Graphic/Printer or Color/Graphic/
- Printer
- \* 200W power supply.
  \* 20MB or 40MB hard disk can be fitted.
- Operating systems: MS DOS 3.1

#### FTC PORTABLE AT

- Intel 80286-8 CPU, 32K AMI legal BIOS.
- Socket for optional 80287 match co-processor.
- 6/8/10 MHZ by software and hardware switchable.
- 1/4 MB RAM on board (41256/1MB DRAM).
- 2 floppy drives (1.2MB or 360KB).
- Mono/Graphic/Printer or Color/Graphic/Printer
- 220W power supply.
- 20MB or 40MB hard disk can be fitted.
- 9" monitor: Amber or Paper white Resolution-Center 900V lines
- Operating system: MS DOS 3.1.
- Size:  $62.5 \times 62.5 \times 34$  cm.



Manufacturers & Exporter

#### FLYING TRIUMPH CO., LTD.

P.O. BOX 18-37, Taipei, Taiwan, ROC TELEX: 23795 FLYTR

FAX: 886-2-7649590 TEL: (02)763-5318 (4 lines)

#### WHAT'S NEW

The 68030 is a more highly integrated version of the 68020, and is expected to include on-chip memory management and a numeric

coprocessor. The 78000 processor, due for release in the first quarter of next year, is expected to be a 20 MIP RISC processor.

#### **Optical Computers**

Following on from last month's news on biological computers, staff at AT&T's Bell research labs have announced a degree of success in the development of an optical computer. Based on light instead of electricity, an optical computer is expected to run about 1000 times faster than current electronic technology. This is good news, as many manufacturers are saying that integrated circuit technology is simply not keeping up with today's demand for

#### speed.

The breakthrough is in the development of the optical equivalent of a transistor. Called a SEED (Self Electrooptic Effect Device), the invention performs a NOR logic function on optical streams. The SEED is fabricated from gallium arsenide and aluminium gallium arsenide, which means manufacturing difficulties, and initially high prices. AT&T says it still has a long way to go, but expects to build a functional optical computer within three years.

#### VM/80386

Softquard Systems, the security disk people who have been badly affected by the current trend away from copy protected software, has announced its next corporate objective. Softguard plans to implement a VM/ 370 style operating system for the 80386. For the uninitiated, VM/370 is an operating system for large IBM mainframes which allows one machine to run several different operating systems at the same time, each thinking it has its own machine. This is similar to multi-user operating systems allowing several users to utilise the same machine, each thinking they have a dedicated computer.

Styled on VM/370, the

Softguard system will allow 80386-based machines to allow several different operating systems at the same time, including Unix and MS-DOS. By supporting multiple copies of the same operating system, Softguard expects to solve the MS-DOS 640k limitation before MS-DOS version 5 arrives, as well as inherently providing multi-tasking.

Softguard expects the new operating system to be ready by mid 1987, but its success seems highly dependent upon what Microsoft can provide in MS-DOS version 5.

END



### **SHOW YOUR COMPANY FLAG**

## AT IREECON '87 Australia's Professional Electronics Convention

#### DON'T BE LAST IN THE RACE FOR SPACE

Please note: The Hordern Pavilion as a venue has been withdrawn by the Royal Agricultural Society.

Alternative buildings ARE available but already bookings have been received for 50% of the Ford Pavilion and the Royal Hall of Industries.

If you are to show your flag at IREECON '87, the 21st International Convention and Exhibition of The Institution of Radio and Electronics Engineers Australia at the RAS Showground, Paddington from Monday, September 14 to Friday, September 18, 1987 you should make your bookings now by contacting—the IREE Australia, Commercial Unit 3, Edgecliff Court, 2 New McLean Street, Edgecliff, NSW 2027 Telephone (02) 327 4822

Pubtlx: AA21822 UserNr: SY135

FAX: (02) 327 6770



## YOU CAN'T IMPORT THE WORLD'S BEST MODEM - IT'S MADE IN AUSTRALIA



The Modem is the most important link in computer communications. And Pulsar Electronics, as one of Australia's longest established computer manufacturers, believes that Australians deserve the best.

After two year's development and field testing, we believe the Pulsar SAM modem incorporates every feature that computer communicators need now, or are likely to need in the future.

Three speeds to cater for users who talk over bad lines, good lines, or need to use Viatel - no need to change switches, or software - in between tasks.

True Hayes compatablity, Autodial & AutoAnswer are just a few of its many features.

Did we forget price? Forget foreign exchange rates. Our all inclusive price is a heart warming \$750 (excluding tax) -and your dollar stays here.

SAM - The world's best modem from:

Pulsar Electronics Pty. Ltd. Catalina Dve, Tullamarine, Vic. 3043 Telephone: (03) 330 2555 Telex: INTMB AA10104 PULSARELEC

PULSAR

ELECTRONICS PTY, LTD.

# XyWrite III Word Processing is here....

#### - Multi-Column Documents

- Word Wrap within columns
- Ideal for scriptwriters, translators, calendars

#### Windows

- Edit (nine) 9 files simultaneously

#### Full Proportional Spacing

- multiple font widths even in the same line
- Word Wrap based on line width
- Newspaper Column Printing
- Automatic Paragraph Numbering
- Styles

Word Processing with exceptional SPEED, FLEXIBILITY, and FUNCTION

For more information or a demonstration diskette call:



165 Queens Road, Connells Pt. N.S.W. 2221 Australia Phone: (02) 546 6499

Dealer Enquiries welcome

Requirements IBM PC or Compatible with 256K memory DOS 2.0 or higher



# The FIE Solution Is Here... Discover It At Comdex Australia '86!

Actually, ARC offers a number of excellent solutions to satisfy your individual computing needs. Each has its own special advantages to help you keep up with an increasingly competitive world.

For reliability, service and support you can trust, discover an ARC Solution - we guarantee it will be the best thing you've found.

#### ARC Turbo

The world's first *Turbo* PC is compatible with the IBM\* PC/XT, and provides plenty of memory plus two speed modes to allow quicker access to all the most popular software. Also included is our 7-Plus Card which provides the most essential add-on requirements one needs to run a computer well. It is the best solution for those who need computer power to cope with a busy schedule.

#### ARC 286 Turbo

The system that outscored the IBM\* PC/AT in recent tests at Arizona State University, the ARC 286 *Turbo* is a must for decision makers and problem solvers. A workhorse which combines the best in Advanced Technology to give you more of what you buy a computer for. No matter what your needs, the ARC 286 *Turbo* has the technology and the speed to keep you in touch with today's ever-changing world.





IBM s a morstered hadrings of about in 16, 1964 to Con

ARC 1101 Monterey Pass Rd., Monterey Park, CA 91754 U.S.A. TEL: (213) 265-0835 FAX: (213) 265-1973

## TURBO MUSCLE, THE PERFECT SOLUTION.

From the company that created the world's first Chinese character generator comes another first. A full range of Turbo PCs unequalled in price, performance and reliability.

American Research Corporation with Pulse in Japan have developed the very latest technology in high per-

formance (IBM compatible) Turbo PCs.

Archives
have added
ARC technology
to their business solutions. Giving you the
option of complete multiuser systems or standalone PCs.
From a Turbo PC based machine
right through to the highest performing
Turbo AT.

American Research Corporation Reliability Technology Value That makes the Archives solution complete. True multi-user business software, the markets highest performing (MicroFive) PC file server, dumb terminals, slave terminals. And now networked or standalone Turbo PCs.

From under \$2,000\* for the Turbo PC/XT, or \$3,250\* for the Turbo AT. And with a small footprint of 30.5cm x 16.5cm x 41cm.

That's less than half the price and half the size of the market leader.

And every ARC Turbo PC comes with a full twelve month warranty.

Call Archives now and find out just how much power and value has been packed into the new ARC range.

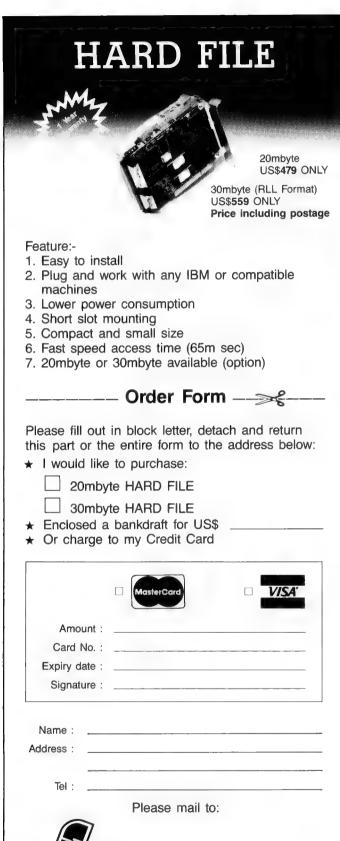
#### archives

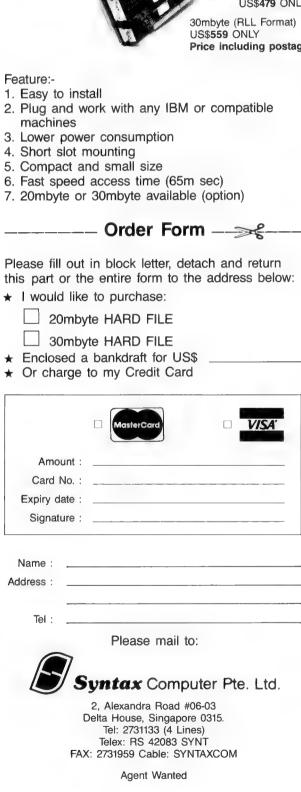
PERFECTION IN MULTI-USER SOLUTIONS

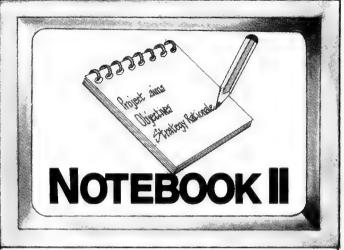
Melbourne (03) 699 8377 Sydney (02) 922 3188 Canberra (062) 476 555 Brisbane (07) 285 2148 Auckland (9) 503 548

\*Price quoted does not include sales tax









## The superior text filing system software limited only by your imagination.

The Notebook II database is endlessly flexible. It can have an unlimited number of records, with up to 30,000 characters (around 10 pages of text) and 50 fields in each record. Each field can hold unlimited text, up to the maximum record size. And you don't need to reserve space in advance, because records and fields expand dynamically as you add text, or even add new fields!

#### Text editing with automatic word wrap too.

Notebook II incorporates a full screen text editor with automatic word wrap to enter information. Add extra files from your word processor or other databases. Browse through the database with Notebook Il's powerful selection function. Print information exactly as it appears on the screen . . . or edit easily into any form you choose . . . or write it to a diskfile for incorporation into documents prepared by your word processor.

For IBM PCs and compatibles.

"For any research notes . . . abstracts of articles . . . library use . . . file registry systems, client information . . Notebook II is really the only game in town".

(Source: Australian PC World)

From your local software house or



1133 Hay Street, West Perth, W.A. 6005 Telephone: 322 6637

Includes sales tax

Adplace 054

#### BIBLIOFILE

Pascal programming on the Mac is the order of the day, with a sprinkling of Basic and Sci-Fi. David Taylor reviews this month's book selection.



#### **Pascal fruits**

The Mac's too matey to program, I find. With a well-stocked hard disk itching to demonstrate this or have a go at that (or swapping the disks if you must), MacOperatives soon find that with Microsoft's Word and Chart, good old MacPaint and perhaps Think Tank, and certainly Jazz, there's not so much you can't tackle without, so to speak, having the bonnet up.

The Mac's mousey environment is, moreover, ill at ease with programming's gobbledygook. It takes all sorts, I know, but personally I'd sooner point the mouse and go than key in lines such as:

if NewArrival. IDNum < Start. IDNum then

#### begin

NewArrival. Next:=Start; Start:=NewArrival; Down:= True

#### end

Besides, Pascalling has never struck me as nearly so much fun as Niklaus Wirth made out. Anyone who names their computer language after an obscure French mathematician (Blaise Pascal) and has their sights set on the educational market should be treated with caution, I'd maintain.

Pascal has always been quite easy to master, I'll give you that: code written in blocks, full of procedures. But until now you had to sit down and plan ahead, scribble things down to compile before you could run. The release of Mac's Pascal finally brings an interactive interpreter to hand (you can see more of what goes on and interfere as programs run), but even so, Pascal scarcely has the kind of bash-on-regardless mentality which a fancy-free Mac tends to encourage.

Still, Messrs Ledgard and Singer seem smitten, and have come up with a very jolly book which aims to prod you towards Pascal problem-solving without boring you to tears learning syntax, parrot fashion. It's jolly because the lads are Sherlock Holmes fanatics and (as in their pre-Mac tome, *Elementary Pascal*) have devised little mysteries for the Great Detective and Doctor Watson to solve with the aid of an Analytical Engine (copyright Charles Babbage).

The idea is that you coo along with Watson at the force of precise, logical thinking exhibited by Holmes, not to mention the Engine. Then you think — Aha! I could do that, using MacPascal. Quite so. Elementary. It's all very silly, but at any rate differently jolly, unlike the

usual run of narcoleptic Pascal primers.

In the end, you can use Pascal to draw squares or a bar chart. You can run a program which, given the properties of cigar ash, identifies the brand of cigar (very Holmesian is that) or one which will keep your golf score (which isn't). Not quite *The Speckled Band*, perhaps, but you will soon find that you've grasped the principles of the algorithm, say, or have got the hang of arrays and strings and mugged up on Pascallian syntax without hardly noticing — all very useful if you're to persist with this urge to program on a Mac.

The book is very handsomely produced, which for nearly \$30 it had better be.

Title: Pascal for the Macintosh Author: Henry Ledgard & Andrew Singer Publisher: Addison-Wesley

Price: \$28.95

## 'Great!' exclaimed Pete . . .

Calling all kids! If you've made a start on

#### SUBSCRIPTION ORDER FORM

Please send me the next 15 months of *APC* for the usual price of 12

This is a new subscription
This is a renewal
I enclose my cheque, made payable to *Australian Personal Computer* for \$42
Please debit my American Express/Bank Card/Visa (delete where not applicable).

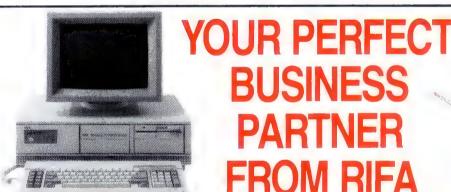
Account No:
Expiry Date:

Signed:
Name:

Post this form to: APC Subscriptions Manager, 2nd Floor, 215 Clarence St, Sydney 2000.

Post code

Australian Personal Computer, the best computer magazine in the business. Subscribe now.





- NEW GENERATION PC
- NEW ADVANCED FEATURES
- HIGH SPEED INFORMATION PROCESSING
- EXCEPTIONALLY HIGH RESOLUTION COLOUR MONITOR
- ERGONOMICALLY DESIGNED KEYBOARD
- COMPATIBILITY
   EXPANDABLE

Whether you're a business-person, or an EDP manager, you have to demand the best performance from your PC equipment. NEC's APC 1V is so advanced it makes most others look like toys.



A perfect match to your APC IV, or existing network.

- HIGH SPEED AND LETTER QUALITY FUNCTIONS
- CHOICE OF PRINTING FONTS
- CHOICE OF PAPER HANDLING SYSTEMS
   RELIABILITY PLUS APC IV

#### CALL RIFA TODAY. FOR MORE INFORMATION ON THESE LATEST NEC PRODUCTS



AUTHORISED NEC DEALER



202 BELL STREET, PRESTON. PHONE: 480 1211 ALSO AVAILABLE TO PERSONAL SHOPPERS FROM MAGRATHS, 55 A'BECKETT STREET, MELBOURNE.

MA RIFA 930



## SAME OLD STORY

It's a boringly familiar sight. Newsagent after newsagent has sold out of *APC*.

You could waste inches of shoe leather each month in the search for that elusive latest issue of Australia's top-selling computer magazine... or you could subscribe! And if you subscribe now, you'll receive 15 issues for the price of twelve. Simply fill in order form opposite.

## ccounti

Businessmen, here's your chance to learn all about computerising your accounts, in your own time, using your own personal computer.

And the information is FREE. It's all contained on a disk titled Attache Tutorial, which presumes no prior knowledge of accounting or of computers.
All you need is knowledge of

your own business and access to an IBM compatible personal computer.

Attaché tutorial is a comprehensive step-by-step guide to using each suite of the Attaché Software accounting modules. These include accounts receivable, invoicing/sales analysis, order entry, inventory control, accounts payable, general ledger and payroll.

Thousands of businesses in Australia and NZ are enjoying the benefits of automated accounting using awardwinning Attaché software.

But others are missing out because they don't know where to start.

Attaché Tutorial is the answer. Just fill in the coupon below for your free disk.

	To: Attaché Software Australia Pty. Ltd., 10th floor, 8 West Street, North Sydney, N.S.W. 2060. Telephone: (02) 929 8700
	Please send me my free disk titled Attaché Tutorial. I understand I am under no obligation to buy Attaché software.
l	Name
ı	Company
ı	Address
ı	
	StateP/code
	Telephone (Bus.)

#### For Real Programmers:

#### WANT TO

- GET IT RIGHT FIRST TIME?
- COMPLETE IT IN RECORD TIME?
- \* KEEP IT RIGHT?
- REDUCE MAINTENANCE COSTS

#### IF SO

#### THEN

#### Write it with STYLUS

THE Structured program editor

#### **ELSE**

try our \$25 demonstration package

STYLUS is a radical breakthrough in program design methodology. It's a new tool which works with sets of logic (NS) diagrams as easily as you now handle words. The benefits of structured programming are just a key stroke away

Program without labels, line numbers or GOTOs. STYLUS forms a structural "front end" for a broad spectrum of languages such as Basic, PL/I, C, (Turbo) Pascal, dBase and FORTRAN.

The Basic package comprises the program editor and Basic translator which converts logic diagrams into structured Basic (ASCII) source code for execution, compilation or for transmission to a remote mainframe.

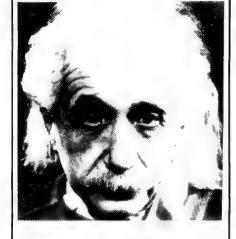
Includes massive help screen system which includes tutorials on the principles of structured programming plus references and bibliography.

STYLUS runs under DOS 2 (or later) on the IBM PC/XT or AT and close compatibles, Apricot, Olivetti and the NEC APC III (native mode). Mono and colour screens supported.

Please enquire for details of site licencing prices.

Here's the point -Clip the coupon now. Try STYLUS and to be blunt - you'll buy it!

From
PCode
☐ Send Basic Demo \$25.00
Send full Basic system \$185.00
FORTRAN 77 translator \$84.00
other translator(s) at \$68.00
(languages)
Computer
☐ Here's my cheque/money order
or Bankcard/Mastercard number
expiry date
Signature
Mail to: Stylus Software Pty Ltd
31 Giennell St. Blaxland NSW 2774
'phone orders/enquiries (047) 39-4749
(formerly Grouse Bell & Assocs P/L)



#### We only use 10% of our mental potentials

These are the words of Albert Einstein, the greatest physicist of recent times.

L. Ron Hubbard's discoveries in the field of the mind prove today that Einstein was right.

In his book DIANETICS: The Modern Science of Mental Health, L. Ron Hubbard takes one more gigantic step in this direction. He demonstrates how anyone can use his discoveries and rid himself of the barriers that have so far prevented him from using mental potentials fully.

More and more people including artists. M.D.s. managers and workers use DIANETICS.

And the thousands of written reports on their successes are the best proof for the quality of this book.

Order your own copy today! Mail the order form below to:

#### DIANETICS INFORMATION CENTRE

201 Castlereagh St SYDNEY, N.S.W. 2000

41 King Street, PERTH, W.A. 6000

106 Edward Street BRISBANE, QLD. 4000 28 Waymouth Street ADELAIDE, S.A. 5000

23 East Row, & 3rd Rooms CANBERRA, ACT 2601 42-44 Russell Street MELBOURNE VIC.3000

YES! Please send n	ne my c	opy of		
DIANETICS: The I			of	Mental
Health by L. Ron H	ubbard.			
Hardback \$27	.00			

Paperback \$7.00
Please debit my Bankcard
Cheque enclosed

_	OII.	cque	CITOTOSCA	
Acco	unt	No.	496	

Valid 6				

Valid from	to
Signature	

Name	
Addres	88

© 1986 by N.E. Publications. All rights reserved. Dianetics and Hubbard are trademarks and service marks owned by Religious Technology Centre and used with its permission.

Real Programmers do it with STYLUS

the first draft of your Christmas list, give this high priority. It's a ripping sci-fi yarn, action-packed adventure for computer mad youngsters - mad as you please, but intended to teach as well as entertain. It's wonderful stuff.

sinister, blackmailing hacker snatches control of NECEN - America's North East Central Computer - and causes mischievous havoc. Hole-in-thewall cash dispensers eat bank cards and make rude remarks to customers. Traffic lights are on the blink. Communications are cut. Then Mr President gets the

'I have NECEN. If you want it back, please transmit the sum of one billion dollars...You have 24 hours to pay

Respectfully, THE HARLEQUIN.'

What's to be done? Well, it's obvious, isn't it? Grab Professor Corbin and his team, shrink them down to the size of a computer bit (using lasers, how else?) and send them in to try and wrest control of the giant NECEN computer from the inside. Piece of cake, really.

En route, as you'll have guessed, we get lots of little lessons on what's what as the Prof navigates a whirling disk drive or rides an analog signal, conquers strange chips and cracks unknown code.

Will he succeed in time? I'm not going to spoil it for you, but you shouldn't need three guesses.

Utterly preposterous, then, childish and fantastic as the best of Superman. I couldn't put it down.

Title: The NECEN Voyage Author: William S Davis Publisher: Addison-Wesley Price: \$32.95

#### **Basically true**

Let's go already, says JCC. True Basic is really fantastic. It'll put an end to Basic dialects, plus it's automatically compiled, and, goshdarn it, a program written for your IBM PC would run just fine, without modification, on your Mac. Wow!

File manipulation is a snap. The graphics capability is out of this world. You want a program to figure the aim for your parabolic satellite antenna to catch the ball game on TV? No problem. Same goes for a routine to show you how the moon will look tonight. Analytical geometry and maths are a bunch of fun besides. Recursive factorial functions zap like nobody's business.

What's happening here is that y'all are 'getting your feet wet' in True Basic, testifies JCC. Maybe y'all will lose a little sleep over this, because there are a couple of hundred pages of listings to pump through here. Still, it's state-of-the-art Basic, as worked over by Basic's original inventors, John Kemeny and Thomas Kurtz. Pretty soon it'll be the world standard, JCC predicts.

Will that many people still want to fiddle about with Basic, True or False, in a few years' time? When everyone's laid hands on a Mac or its successors? No offence, JCC. Just thought I'd ask, that's all.

Title: True Basic: Programs and Subroutines Author: John Clark Craig Publisher: TAB/Nelson

Price: \$32.90

END

## ANCE Computer Pty. Limited

84 EDWIN STREET NORTH, CROYDON NSW 2132

IBM PC systems and packages at unbeatable prices check below for our system specials and talk to us about the right programme for your business.

#### **IBM AT 339 PC (8MHz)**

 512Kb Memory • IBM Colour display
 IBM 1.2Mb Floppy Disk Drive • IBM
30Mb Fixed Disk Drive • IBM Keyboard PC DOS Version 3.2

Only \$9251 incl. sales tax

#### IBM XT 489

• 512Kb Memory • IBM Keyboard • IBM Colour display • IBM 360Kb Floppy Disk Drive • 20Mb Fixed Disk

Only \$5658 incl. sales tax

#### Drive • PC DOS Version 3.2

#### IBM AT Enhanced PC

 512Kb Memory • IBM colour display IBM1.2Mb Floppy Disk Drive

IBM20Mb Fixed Disk Drive . IBM Keyboard . PC DOS Version 3.1

Only \$8764 incl. sales tax

#### IBM PC CONVERTIBLE

(Laptop)

512Kb RAM . Dual 720Kb Diskette Drives • PC DOS Version 3.2

Only \$4069 incl. sales tax

LIMITED SUPPLY

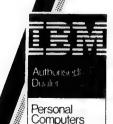
#### IBM PC

 256Kb Memory • IBM Monochrome Display • IBM 360Kb Floppy Disk
 20Mb Fixed Disk Drive • IBM Keyboard ● PC DOS Version 2.1

Only \$3579 incl. sales tax

#### IBM PC SOFTWARE

IBM Displaywriter 3 ver. 1.1: \$546 LOTUS 1-2-3: \$745 IBM PC Storyboard: \$370



Don't miss out on these Super Specials, Contact: John Mayer. Richard McOuade or Paul Buganev.

#### **SCREENPLAY**



This month's selection of games finds Stephen Applebaum playing with marbles and saving the earth from doom and destruction.

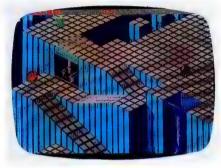


## Marble quality Title: Marble Madness Computer: Amiga, C-64 Supplier: ECP Price: \$89.95 (Amiga), \$59.95 (C-64)

When we talk about graphics being arcade quality, we mean that they're in some way comparable to those found on machines down at your local arcade; the term isn't meant to suggest they are perfect reproductions. The screenshots above, taken from Electronic Arts incredible new acquisition for the Amiga, Marble Madness, expunge any ambiguity, however, and show the skill that has been employed in bringing an arcade classic into the home, with total fidelity.

Although not featured in 'Screenplay', there have been several earlier attempts by companies to write games for the Commodore 64, et al, that imitate some of Marble Madness' features. Most of them are all fairly dismal and often unplayable affairs. Now we have an accurate reproduction of the archetype of the genre that not only mirrors the original, but if anything, makes it even more playable.

Marble Madness, for those who haven't yet seen it, is a hazardous race against time, where you must guide a marble around a series of obstacle-



strewn mazes inside a pre-set time limit. The coin operated Marble Madness machine employs a large tracker ball as the means of manipulating the sphere. Electronic Art's version can use a tracker ball as long as it has an Atari-standard plug, but most players will probably find the Amiga's mouse perfectly adequate.

The initial phase of Marble Madness is a simple training run along a meandering groove, ending between two fluttering flags representing goal-posts. Hardly representative of what's to come, this first stage is merely a friendly way of familiarising the player with the feel of the controls.

Marble Madness proper begins with you and the marble having to battle your way past a rogue ball, which tries its hardest to force you off the edge of the screen. If you're lucky, the ball only gets as far as pushing you onto another level, but this leaves you dazed and, at worst, prey to a bunch of even more malevolent characters.

Evading the black ball takes you down a precipitous drop which lands you on a plateau inhabited by green, voracious, hydra-like creatures. These gluttonous monsters leap into the air, land on your marble, swallow it, then pause momentarily to lick their lips in appreciation of the impromptu meal.

To avoid being consumed, you must steer your marble across a bridge that opens and closes on superbly drawn, fully-animated hydraulic jacks. This leads to a conduit running down onto a ledge



that twists and turns, threatening to send you to your death at the slightest hint of a mistake. Navigate this section successfully and you'll come to another pipe which leads to the relative safety of an ice field, the last 'hazard' before your goal.

As the game proceeds, the number of hazards increases in both number and severity. At one point, giant vacuum cleaner-type machines appear and try to suck you up into oblivion, while tiny rubber mallets emerge from underground, crushing your marble to a pulp. There are even giant rods which toss your marble into the air, sending it plummeting to its death.

Points are scored by completing a phase within the time set at the start, as well as reaching specific points on a course and eluding the various things lurking there. Bonuses can be picked up by having time left at the end.

Much like Arcticfox, also reviewed here, Marble Madness includes some superb sound effects. The music, a farrago of delightful little ditties, is an exact simulation of that found on the arcade original. Even the vicious vacuums make a disturbing roar as they appear, seemingly from nowhere.

One of the most amusing features of Electronic Art's Marble Madness is the inclusion of all the original 'bugs', or rather, idiosyncracies. The most obvious of these is the game's collision detection. For instance, if a ball falls off a surface and touches a wall as it drops, a brush appears in mid-air to sweep up the

pieces. Apart from this rather nice effect, there aren't any other quirks poignant enough to warrant a mention. Marble Madness is a game with balls. If ever there were a game that could be

accurately dubbed arcade quality, this is it.



#### Fire and ice

Title: Arcticfox Computer: Commodore Amiga Supplier: ECP Price: \$89.95

Beware — the enemy is among us! Somewhere in the icy wastes of Antarctica, an alien cadre is busily preparing the way for an Armada from its home planet, STV-7X, by building towering edifices to convert the composition of the Earth's atmosphere into a form more suited to its physiological makeup.

With each passing day, the alien's grip on the Earth tightens, pulling Mankind ever nearer to the abyss. Oblivion is not far off, unless something can be done to breach the extensive forcefield protecting the creatures and destroy the heart of their operation — the Main Fort.

And so to Arcticfox, a supertank, built courtesy of General Polemics. In your capable hands this formidable piece of hardware could prove to be the alien's nemesis. If it doesn't, the rout of civilisation will be quick to follow.

When positioned in the driver's seat inside the Arcticfox, you can look out through a large window into the almost extraterrestrial Antarctic landscape; below, a small radar-cum-aft-view offers another perspective. Located along the bottom of the display is a control panel.

To the right, a hand grips a joystick, simulating the movement of your hand as you steer the Arcticfox to its quarry; on the left are six buttons, over which is poised the computerised driver's other hand.

The six buttons relate to six keys laid out in a similar form on the Amiga's keyboard. These correspond to: cannon



inclination; aft view selector; mine release; relative reverse; guided missiles; and dig-in. Most of these devices are self-explanatory, but it's worth looking at some *in extenso* by dint of the work that has gone into the detail of their operation and effect.

When a guided missile is launched, it can be steered toward its target from the safety of the Arcticfox. If you're feeling particularly sadistic, however, you can become the missile itself, putting yourself in the position of a pseudo-Kamikazi pilot. In becoming the missile, you temporarily gain the ability to fly, and can engage enemy aircraft in a deadly game of cat and mouse.

Pressing the 'dig-in' function when in snow literally buries the Arcticfox, protecting it from almost any enemy onslaught. Going to ground also provides protection during one of the many electric storms that become increasingly more frequent as you near the Main Fort, caused by the oxygen in the atmosphere being replaced by a volatile mixture of deadly gases.

Accompanying the master controls are various dials and digital counters which provide vital data such as the number of guided missiles you have left, the number of mines onboard, the tank's speed, your direction, the percentage of oxygen in the air, and a constantly updated damage report.

Before setting out on a mission, the game's one and only menu lets you identify the various kinds of enemy craft — an idea dreamed up by an Electronic Arts games tester who didn't survive long enough to see his executioner, no doubt. Beginners can, and should, start on the easy level, as this has a smaller number of alien craft around the Main Fort. If you're a glutton for punishment you can move straight on to the advanced level where, unless you employ a good stratagem, you'll be wiped out before



getting anywhere near the alien HQ.

Dotted about the landscape are Communications Forts that the aliens have deployed to keep them posted as to your whereabouts. These, and things called Recon Sleds and Recon Flyers, can reveal your position to other craft in the vicinity, so should be destroyed when first spotted.

At the end of a game (which is to say, when you've been destroyed) you're presented with a tactical rating and the manner in which you met your death. Apart from being ripped apart by enemy gunfire, which is an obvious way to go, you can meet the man with the scythe by driving the Arcticfox into a crevass!

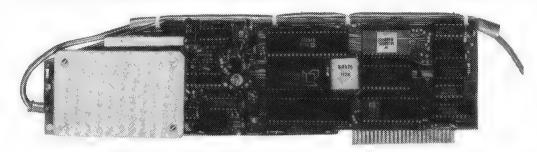
If you're one of the few people who currently owns an Amiga, you'll no doubt be aware of its amazing stereo sound. Should you not have bought any games for it, however, you probably won't realise just how good it is. Play Arcticfox and you'll be enthralled by the realistic trundling of the tank's caterpillar tracks, and the pleasing crunching sound made when passing over the wreckage of an alien vehicle. Missiles, too, make an impressive whooshing noise, while forked lightning strikes the ground with a veritable crack.

Arcticfox is also impressive graphically, using filled Battle Zone/Elite-type figures. Unfortunately the speed of movement is slow, but because everything moves at around the same pace, missiles included, the game is just as difficult as if everything were moving at full tilt.

It has taken a long time for the APC office to be graced with an Amiga, but if all the software is of the same high standard as Arcticfox, it has been well worth the wait. Although a little pricey, Arcticfox justifies every last cent, and the enjoyment it gives will make you forget about the hole it has left in your pocket.

#### MODEM FOR APPLE II & III

W IN STOCK WITH FULLY OPERATIONAL FIRMWARE & NEW FEATURES



\* Super intelligent direct connect MODEM/VIATEL terminal for APPLE II, IIE & compatibles fully contained on a single card — plugs into slot#2 — does not require separate serial card or software. All software is permanently resident in an onboard 128K EPROM. It is hidden in the slot#2 card space, leaving the whole of memory completely free for other programs unlike disk based comms software which must occupy the main memory excluding other programs. It is menu driven and automatically senses for ProDos or DOS 3.3 operation. Received files are appropriately converted before saving and can be used.

Sending/receiving files is very simple:—
— Press "ESC" to display menu.
— Select "(S) END A FILE" option

- Answer the prompt "FILENAME?:"

The modem will search the disk for the file, make all the decisions (e.g. binary, basic, textfile, DOS 3.3 or ProDos) and transmit it in the correct format. <CR> transmits the file in memory. Similarly to receive a file select "(R) ECEIVE A FILE" option.

- \* AUTO ANSWER AUTO DIAL. Senses true dial tone, ring tone, busy tone and acts intelligently, returning status messages. Characters can be included in the phone number to set baudrate, pause, "await dialtone" and multiple redial on busy. On answer, it selects the incoming baudrate by precision frequency measurement. This is much more reliable than the normal autosearch using carrier detect which is often confused by voice and phone tones. A reliable autosearch is a must for bulletin board operation.
- \* 300 Baud full duplex or 1200/75 and 75/1200 with fast automatic line turnaround. An upgrade kit to add V22 (1200/1200 baud) and V22 Bis (2400/2400 baud) will be available later.
- \*Main menu option "(V)IDEOTEXT" shows the VIATEL menu. It becomes a full graphics VIATEL terminal, automatically dialling and transmitting the user ID stored in the battery backed ram. When online, a keypress will immediately save pictures to memory. These can be reviewed later and selectively saved to disk or printed (requires a graphics printer card). Pictures can be loaded from disk and printed out. The modem can act as a videotext host and can be programmed to act on frame information. e.g. — use the clock to ring "MONEYWATCH" hurly and dial you at the office if your shares move outside a given range.
  - \* TELESOFTWARE DOWNLOAD facility to purchase programs over VIATEL from suppliers such as MICROTEX 666 and TANGO.
  - \* A full wordprocessor in EPROM for pre-composition of text before transmission. It can also be used to edit or print received files as well as for general wordprocessing.
- \* Onboard battery backed calendar clock can time and initiate calls or keep an activity log. ProDos uses it to time and date disk files and it is accessible from Basic.
- \* 2Kx8 battery powered CMOS RAM stores default parameters, phone numbers, ID, password, logon strings, search codes and setup parameters (e.g. baud rate, parity, printer ON) for each number, allowing single keystroke call establishment to specific areas of complex databases. Main menu option "(T)ELELIST" displays the list of 23 names and one is selected.
- \* Incorporates XON/XOFF and CHRISTENSEN error correcting protocol. Textfiles are not so fussy but error correction is a must when transferring program files. A debug function can display normally invisible control characters sent by the host.
- \* Can output directly to printer even when online at 1200 Baud a fast printer is not required as the printer is spooled out of the receive buffer. A "FILTER" function is available to remove screen control characters from textfiles (these can drive a printer crazy). Special scroll routines print to 80 column screen and printer at 1200 Baud without any lost characters.
- Unique "PHANTOM MODEM MODE" function allows the modem to be permanently connected with the normal phone. When answering, if it doesn't immediately detect a calling modem it generates ringing tone back to the calling party and sounds the APPLE bell, giving you 60 seconds to answer the phone.

If you have previously purchased this modem and have not yet received an updated EPROM VERSION V2.18 and a manual, contact AUTOMATIC ICE CO. — there is no charge for these

#### **AUTOMATIC ICE COMPAN**

Mastercard & Bankcard

PHONE (049) 63 3188 — (049) 63 1386

(incl S/T)

#### COMMUNICATIONS

## More BBS wordplay

Steve Withers presents his monthly round-up of bulletin board news.

#### **Abbreviations**

Continuing with last month's theme of wordplay and non-verbal messages, I recently encountered a couple of new examples. I suspect the first comes from someone with a mathematical inclina-

tanh(q) in antic.....ipation while I can only assume the second is supposed to signify mild confusion:

#### Overseas news

Sysops in the UK recently formed a group called the Bulletin Board Operators' Association. with the following aims:

- 1) to encourage public electronic communication of data;
- 2) to promote and co-ordinate individual bulletin boards:
- 3) to establish and maintain standards and practices by means of a code of conduct.

It seems that there were two main reasons for the formation of this organisation. Firstly, it will provide a united front for dealings with British Telecom. A fairly popular BBS in the UK generates the equivalent of \$500-\$1000 in revenue for British Telecom (even local calls are timed) and the sysops feel that some concessions are due to them. Secondly, there are fears that recent publicity about hackers' BBSs could lead to a clamp-down affecting legitimate systems as well as those promoting illegal behaviour.

#### System news

FidoNet is going from strength to strength, with more than a dozen systems in the eastern states. I've heard from someone in Perth who plans to join the network, but (so far as I know) all the existing systems are in New South Wales, Victoria, and the ACT.

Mark Little writes that his system one of the few in the Northern Territory is back in business (whoops, I hadn't heard that it had gone off-line!). He says that the most significant feature of the new software is that it provides a screen editor with WordStar-like commands. Of course, the system needs to know what type of terminal you are using (or emulating) to achieve this, but the 50odd definitions should cater for most users. The program's size is a mere 16k, but that's the result of writing in Z80 assembler instead of making do with the bloated output from a compiler. Mark's system is also one of the few that can be accessed by packet radio as well as telephone.

#### New systems

#### NSW

Aus Talc (02) 438 3479, 24 hours daily. V21, V22. A FidoNet system.

Fido Australia (02) 959 3712, 24 hours daily, V21, V22, V22bis, A FidoNet system. (Previously listed as Ausnet).

Scitec Olympic (02) 427 1212. 24 hours daily. V21, V22, V22bis. A FidoNet system.

Tachyonics (02) 438 2682. 10pm-6am daily, V21, V22, A FidoNet system.

Canberra PCUG (062) 58 9967. 24 hours daily. V21, V22, V22bis. A FidoNet system.

#### Victoria

Sam's (03) 563 1117. A FidoNet system.

#### Updates ---

#### NSW

Freecom Off-line.

Omega Line (02) 457 8281. P. Geoff Arthur. 24 hours daily. V21, V22, V23. A FidoNet system.

Realtors (02) 387 5335, 24 hours daily. V21, V22, Bell 103 & 212. A FidoNet

Sentry (02) 428 4687. MV. Trev Roydhouse. 9pm-6am weekdays. 8pm-6am weekends. A FidoNet system.

Sorceror Users Group (02) 626 8020. 24 hours daily.

#### Victoria

The Real Connection (03) 288 0331. Carla Miller. 24 hours daily. A FidoNet system.

#### NT

Telepack (089) 52 8852. Mark Little. 24 hours daily. V21, packet radio. Previously listed as Red Centre.

The material in this column is presented in good faith, but as it is collated from material porovided by readers, APC cannot take responsibility for its accuracy. New information and corrections are always welcome (but please mention whether or not you can vouch for the accuracy of the material you provide), and should be sent to Steve Withers at one of the following addresses: C/- Computer Publications, 77 Glenhuntly Road, Elwood, Vic 3184. Viatel 063000030, Teledata 11UNR-WITHERS.

Acknowledgements will normally be made through this column. You may also like to send a copy of the information to the Australian PAMS Coordinator at one PO of these addresses: Box E41, Emerton NSW 2770; ACSnet prophet: prophet@runx; Teledata Prophet Bulletin Board (02) 628 7030. END

#### Cheap and Cheerful!

IBM PC Apple Mac

Heaps of el cheapo disks for IBM PC, Apple II and Macintosh. Business programs, games & programming utilities.

For our latest catalogue, with many new disks, call us on 03-772 7566, and be ready to tell our nasty answering machine your name, address and make of computer. Or you can write to us at Interface Publications, 34 Camp St., Chelsea, Vic., 3196

#### R&D puts DIGICOM head and shoulders above the rest.

New kid on the block

HD/FD CONTROLLER



DIGIS-NEW PRODUCTS Enhanced-Speed/Color/Function









STREAMLINED AT-TURBO





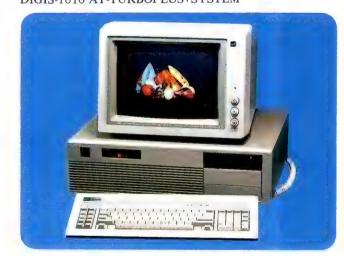


DIGICOM products are of the latest technology and highest

quality available today. They are designed to enhance your systems and sales, and keep you one step ahead of the pack. Of course, they're at prices that will make you competitive.

- DIGIS-80286 SPEEDCARD -makes your XT perform like an AT -6-layer board runs at 8MHz, toggles easily between AT&XT speeds -10% faster than popular speedup cards
- DIGIS-286 AT-TURBO MAIN BOARD -6/8MHz or 6/10MHz at zero wait states (12MHz in future) -4 built-in serial and 1 printer ports on board
- DIGIS-286S MINI AT-TURBO -8/10MHz or 8/12MHz, 1 serial port on board -standard mounting holes fitted in PC/XT or AT case
- DIGIS-1000 ENHANCED GRAPHICS ADAPTER -256K of memory and 1 parallel port on board -640x340 pixels with 64 colors, 720x348 monochrome mode
- DIGIS-1088 HD/FD CONTROLLER -for 360K/1.2MB floppy and 10MB/20MB/40MB hard disk drive
- DIGIS-286B STREAMLINED AT-TURBO -6/8 MHz or 6/10 MHz at 0 wait states (12MHz in future)
- DIGIS-1616 AT-TURBOPLUS + SYSTEM -fully IBM AT compatible, with 4 serial and 1 parallel ports on board, expandable 1MB RAM -6/8MHz or 6/10MHz speed at zero wait states
  - -1.2MB/360KB floppy or 20MB hard disk drive as requested -DIGIS-1000 E.G.A.; AT compatible keyboard -switching power supply: 220W (110/220V)

DIGIS-1616 AT-TURBOPLUS+SYSTEM



See us at COMDEX/Fall'86 booth No. R 8218.



9th Fl., No. 109, Sec. 4, Jen-ai Rd., Taipei, Taiwan, R. O. C. Telex: 12175 DIGICOM Fax: 886-2-7415565 Tel: (02) 741-5561 (8 lines)

## In the nick of time

It's seven years since the original APC Benchmarks were devised, so we felt it was high time new Benchmarks were created to accommodate modern trends in hardware and programming languages. Nick Walker presents the definitive, but very flexible, APC Benchmarks.

Ever since APC started back in May 1980, we've been testing machines with a set of Basic programs designed to test the speed at which certain routines are carried out. The original Basic Benchmarks, which were designed by the defunct US magazine Kilobaud, were created to provide an objective measure to evaluate the performance of the system and, more importantly, to provide comparison with other similar machines.

The original *APC* Benchmarks were created at a time when a good home computer contained 8k of RAM, 8k of ROM, a cassette tape interface and, if you were extremely lucky, some primitive form of screen output. The only common thing you could rely on was that practically all the machines had a version of Basic on tape or in ROM. It isn't surprising, therefore, that the Benchmarks were written in Basic and made no attempt to access any I/O.

It's a credit to these original APC Benchmarks that they have survived eight years of the micro business. It's rare even now that a machine doesn't have a version of Basic available, though it's certainly not unknown. However, it's true that these Benchmarks are considerably less relevant today than they were. The machines tested now spend most of their time running applications that typically use a disk drive interactively, and address both the text and graphic modes of a screen. It's rare that any of these applications are written in Basic.

The original Benchmarks have provided a standard for eight years, and a vast amount of data is now available. The time has come to create new Benchmarks that are more relevant to the operations a micro might spend its life performing.

#### Design criteria

One of the reasons for the success of the original *APC* Benchmarks was that they were short and understandable. Users of

```
intmath:
declare three integer variables X, Y and I
  assign X equal to 0 and Y equal to 9
 write 'Start' to screen
  repeat 1000 times using I as the loop variable:
    assign X equal to X+Y-Y*Y/Y (use integer divide if provided)
  write 'Finish' and X to screen (final X value should be 0)
realmath:
  declare two real variables X and Y
  declare an integer variable I
  assign X equal to 0 and Y equal to 9.9
  write 'Start' to screen
  repeat 1000 times using I as the loop variable:
    assign X equal to X+Y-Y*Y/Y
  write 'Finish' and X to screen (final X value should be 0)
triglog:
  declare two real variables X and Y
  declare an integer variable I
 write 'Start' to screen
  assign X equal to 0 and Y equal to 9.9
  repeat 1000 times using I as the loop variable:
    assign X equal to Cos(Sin(ArcTan(Log(Y))))
  write 'Finish' and X to screen (final X value should be 1000)
textscrn:
  declare an integer variable I
  write 'Start' to screen
  repeat 1000 times using I as the loop variable:
    write '1234567890gwertyuiop' and I to screen
  write 'Finish' to screen
grafscrn:
  declare integer variable I and J
  write 'Start' to screen
  repeat 100 times using X as the loop variable:
    repeat 100 times using Y as the loop variable:
      plot pixel at screen position (X,Y)
  print 'Finish' to screen
store:
  declare an integer variable I
  write 'Start' to screen
  create a disk file 'Test'
  open 'Test' for input
  repeat 1000 times using I as the loop variable:
    write the record '1234567890qwertyuiop' to 'Test'
  close 'Test'
  delete 'Test'
  write 'Finish' to screen
```

Fig 1 English description of new Benchmarks

#### BENCHMARKS

any machine, even if it weren't Benchtested in APC, could type in the Benchmarks and get a measure of how fast the machine is compared to its rivals. I recently made a call for suggestions as to what form the new Benchmarks should take. Among the letters received were a number calling for a 'complete system test' consisting of a vast amount of compiled code which would extensively test the whole system. While I agree that such a test would give a more accurate basis for comparison, it would severely limit the number of users able to run the test. Therefore, the new Benchmarks are of a similar length to the old.

The old Benchmark timings are usually ascribed to a particular machine when it would be more correct to refer them to a machine and dialect of Basic used. For example, an IBM PC running the latest version of GWBasic is noticeably quicker than an IBM PC running BasicA, which explains why all the IBM clones are quicker than the original.

To overcome this, the new Benchmarks have been specified in a language-independent form. This makes them capable of comparing different versions of the same language in a language review, or capable of testing the speed of a machine when compared with a rival machine running the same language.

Having decided that the Benchmarks should be short and language-independent, by far the most difficult decision was determining which features the Benchmarks should test. After much consideration, the following were chosen:

(1) Two separate Benchmarks to test integer and real arithmetic. Integer arithmetic gives a good indication of the general processor speed, whereas real arithmetic speed depends on the quality of algorithms in the software, unless a floating-point chip is used.

(2) A separate Benchmark to test logarithmic and trigonometric functions, as these are primarily of interest to scientific users and certain heavy number crunching business applications.

(3) Two separate Benchmarks to test the speed of text and graphics screen I/O. The graphics screen I/O test should use nothing more complex than Plot (x,y) to enable it to be run on as many machines and languages as possible.

(4) Some test of disk speed was required; this proved the most difficult to design as disk speed is affected by so many factors. For example, an old hard disk will perform more slowly than a new one, due to file fragmentation. The Benchmark we chose does not attempt to overcome these problems, but it's

simple and our subsequent experiments proved it to be a reasonable index when compared with far more complex disk test procedures. Most users don't start with fresh disks every morning, and the aim of these Benchmarks is to reflect real world usage, albeit at the cost of strict scientific comparability.

#### The new Benchmarks

There are six Benchmarks:

- IntMath: tests integer mathematics speed
- RealMath: tests real mathematics speed
- TrigLog: tests speed of trigonometric and logarithmic functions
- TextScrn: tests screen I/O with a text screen
- GrafScrn: tests screen I/O with a graphics screen
- Store: tests disk I/O

When translating the Benchmarks into a different language or dialect, try to produce code that closely matches the structure of the English description. Don't use quick and dirty short-cuts to gain a few tenths of a second, as this is just misleading. A good rule of thumb is that for every line of the English

'A good rule of thumb is that for every line of the English description, there should be one or more corresponding lines in the code.'

description, there should be one or more corresponding lines in the code. If you can't relate each line on this one-to-one or one-to-many basis, take a second look at your source code.

It's quite possible that some languages will be unable to run some of

the Benchmarks. Don't resort to convoluted tricks in this case; a blank conveys as much information as a timing, namely that this language is a poor choice for the task.

Finally, there will be no average figure. The average figure of the original Benchmarks was totally meaningless and the most abused by manufacturers. With only six Benchmarks it isn't difficult to assimilate all the necessary information, if that's what you want to do.

The advantage of the new Benchmarks is their flexibility. They can compare different machines running the same language; different languages on the same machine; and the same language on the same machine in different environments. For example, you could run TextScrn on a GEM-based computer in different sized windows, or with different numbers of windows open.

#### Conclusion

To make these Benchmarks work, we need to gather as much information as possible about current hardware and software. In the coming months, APC will test as many machines as possible and publish the results periodically. However, there's no way that we can cover all the machines and all the languages, which is where you can help. If you run these new Benchmarks on your machine, please send us the results, complete with source code, and help us make them as successful as the original Benchmarks.

I'd like to think of the Benchmarks as frozen, but if you have any serious objection to them as presented in this article, please let me know. Next month, we'll turn our attention to the problem of devising a scheme for the compatibility of IBM PC clones.

END

IBM PC running	IntMath 0.18	RealMath 4.0	TrigLog 56.4	TextScrn 76.4	GrafScrn 5.0	Store 4.9	,
Turbo Pascal IBM PC running BasicA	6.2	8.2	47.0	100.0	49.0	17.2	
IBM PC running PC Forth	0.3	_		67.0	2.4	1.9	
Atari ST running ST Basic	1.5	1.9	7.9	44.8	22.7	9.9	
Atari ST running Megamax C	0.16	1.1	7.9	39.6	7.7	7.1	
Commodore Amiga Basic	1.7	2.7	6.7	150.3	25.0	32.7	

Notes: The IBM PC used an external Ampex hard disk with Xebec controller; both the Amiga and the ST used the internal 1 Mbyte floppy

Fig 2 Table of results

## INTRODUCING

#### A SMALL BREAKTHROUGH IN MODEM DESIGN

#### YOUR TOTAL SOLUTION

Not only is the Data Sat plug in modem and Vtex communications software packaged to provide you with a fully intelligent **VIDEOTEX SYSTEM** to suit **YOUR** special requirements, but you also receive:

#### ALL THE EXTRAS YOU ASKED FOR . . . NO EXTRA CHARGE!

- SIZE: NEATLY fits in one half card slot
- COMMS: 16 port addresses are available
- HELP: TWO SCREENS of ON-LINE information on modem commands and registers
- DATA: ALL character formats are correctly handled
- DIALING: AUTO DIALING Hayes compatible
- COMPUTER: IBM-PC/XT/AT/Convertible or compatible
- DRIVE: HIGH CAPACITY bus drive.

#### MANY POWERFUL FEATURES

One of the most POWERFUL features of the software is its easy to use MACRO COMMAND system which enables you to save a series of keystrokes or functions to the MACRO SUB-MENU. Tedious and time consuming manual key entries are reduced to a minimum.

For example, AT A TOUCH you can AUTO-DIAL your Videotex database to logon, select the Telex option then IMPORT a previously prepared text file, send it as a TELEX and then save all of your personal MAIL direct to disk or have it printed out!

#### **ALSO SUPPORTED**

- TELESOFTWARE, ASCII and X-MODEM protocols
- FULL 8 COLOURS from a standard CGA card
- AUTO UP/DOWN LOAD transmission at 1200 baud
- ACCESS of your PC by a remote terminal
- Telecom Direct Connect Authorised.

DEALER ENQUIRIES WELCOME

#### DATA SAT MODEMS — the intelligent connection

8 Lachlan St, Liverpool N.S.W. 2170

TEL: (02) 8211622

## COMPUTER GRAPHICS? DRAW ON OUR EXPERIENCE

Now you can turn your computer into a graphic workstation. Whether you are into graphic art, Computer Aided Design, excellent business presentations, or just having fun — Summagraphics Digitizers from Minicomp will give you the perfect picture every time. And it is as easy as putting pen to paper!

Summagraphics' extensive range of digitizers are compatible with your machine and run with a large selection of software. AutoCAD, Dr Draw, GEM, Mirage, TopView, Macpaint, and MacWrite to name a few. All this plus the

latest technology which offers resolution of up to 1000 lines per inch.

We even have a tablet designed especially for the Macintosh called MacTablet. Just plug it in and realize the full potential of your Macintosh's exceptional graphics. MacTablet's pen stylus performs all the functions of the mouse yet is far simpler to use — its like the difference between drawing with a pencil and drawing with a round of Camembert. Tracing an existing drawing into the Macintosh is easy — you can trace from originals up to 1/2 inch thick.

Ask your dealer to show you how a Summagraphics digitizer from Minicomp will turn your computer into an exciting graphics system.

Solely distributed by

**Minicomp** 

Minicomp Building 104 Mount Street, Nth. Sydney 2060 Ph: (02) 957 6800



168 KB

## DISCWARE introduces non-obsolescence THE KAYPRO PC

#### **NEXT YEAR'S TECHNOLOGY?**

That's easy. Replace the existing IBM PC/XT board with an IBM PC AT-compatible board, available now; IBM 32-bit standard, available soon; or whatever the future holds.

#### **MEMORY-HUNGRY SOFTWARE?**

The Discware Kaypro comes standard with 768 KB — and if that's not enough plug in an Above Memory board of your choice.

#### **HIGH-RESOLUTION**

#### GRAPHICS? -

KAYPRO's standard multivideo board features perfect monochrome clarity plus high-resolution colour (IBM CGA). But, if it's IBM EGA that you want? — simply snap in a board.

#### FURTHER SYSTEM EXPANSION?

But of course! The KAYPRO PC is ready for anything. With six available slots, add what you need — networking, modems, more memory — the sky's the limit.

#### MONITOR

A large range of monochrome and colour monitors available.



#### **NOVELL ADVANCED NETWARE**

Network your Kaypros with Novell Advanced Netware/O. Let us design a network application for your business needs.

#### PLENTY OF STANDARD FEATURES?

#### POWER SUPPLY:

A generous 132 watts of power for even the most demanding hard drive.

#### FLOPPY DISK DRIVES:

Dual IBM-compatible floppy disk drives standard or slide in the drive of your choice.

#### HARD DRIVE EXPANSION:

Space provided for easy additions of internal hard drives.

#### **BUNDLED SOFTWARE:**

A full selection of business software for today and tomorrow.

#### KEYBOARD:

Detachable, IBM PC AT-style keyboard with security keylock.

#### **The Discware Guarantee**

Not only does the Kaypro PC carry 12 month warranty, but, Discware offers an unprecedented support plan.

Should your Kaypro PC malfunction during the warranty period we will either replace or repair the faulty computer on the spot.

And we provide hot line support free of charge.

\*Discware support plan applies only to computers purchased from Discware. Full details available at our offices



5th Floor, 3 Smail Street, Broadway NSW 2007 Tel: (02) 212 6933

## the biggest range of PC products AT THE BEST PRICES

Olivetti M24 Hard Disk

\$5490

640KB RAM, 20MB internal hard disk, 360KB floppy disk drive, parallel and serial ports, hi-res green or amber monitor, 6 month warranty.

#### **SUPER CALC 4**

\$599

The Lotus eater, bigger and faster, reads 123 files, introductory offer.

#### HERCULES RAM FONT

\$499

The New HERCULES MONO GRAPHIC Board with Ram Font.

#### KAYPRO 286i

\$4,700

The AT-compatible Kaypro. 80286 @ 8MHz, 640KB, 1.2 MB floppy.

#### SUPER SPECIALS FOR THIS MONTH ONLY

Seagate 20 MB	\$949.00
Le Modem	
Seagate 30 MB	\$1190.00

#### Kaypro 2000

\$2795

768KB RAM back lit LCD screen option 3.5" 720KB built-in floop 2 and RAM disk, real-time clock 3007 option + hard disk option bundled software.

#### Olivetti M24 SP

**IBM SOFTWARE** 

**SCall** 

8086 @ 10MHz, 640KB, 20 MB, limited stock

**EGA Monitor & Card** 

\$1,425

Our

#### YOUR NETWORKING SOLUTION:

Novelle Advanced Netware 3-Com Network

fr. \$2,500.00

Toshiba P351 Printer

Scall

The finest 3-in1 printer Toshita 113de: 288 cps draft mode, 160 cps letter quality, 180 x 360 dos 11 graphics! 24 pin dot matrix, downloadable fonts, true letter quality

#### Toshiba T3100

Scall

The AT-compatible lap top.

#### YOUR COMMUNICATIONS SOLUTION:

Imagineering's Le Modem by

NetComm

\$360

300 baud, 1200/75 baud, auto-dial auto-answer, ½ card, totally internal.

IBM SOFTWARE		Our
	RRP.	
Borland's Superkey	169.00	119.00
Clipper Compiler dB III	1349.00	899.00
Copywrite	125.00	85.00
Crosstalk XVI	315.00	199.00
dBase III plus	1470.00	945.00
Fastback	299.00	250.00
Framework 2	1395.00	1050.00
Graftalk 4.08	1350.00	1199.00
Harvard Total Project Manager	1049.00	699.00
Harvard Presentation Graphics	849.00	569.00
Lattice 'C'	995.00	875.00
Lotus 123 rel. 2.01	1099.00	650.00
Microsoft Word V.3.0	999.00	745.00
Microsoft Word V.3.0 Mouse	1299.00	945.00
Mirror	145.00	109.00
MultiMate 3.3	1199.00	45.00
Norton Utilities 3.1	175.60	149.00
Open Access V.2.0	1299.00	899.00
Paradox	1470.00	959.00
PC Alien	105.00	99.00
Reflex 1.1	298.00	229.00
Symphony 1.2	1470.00	959.00
Side Kick ver. 1.5	109.00	85.00
TK! Solver 1.6	599.00	499.00
Timeline ver. 2.0	890.00	670.00
Turbo Lightning	225.00	149.00
Turbo Pascal, 8087, BDC	fr 125.00	fr 85.00
		_

	RRP	Price
Turbo Prologue	200.00	149.00
TypeQuick	87.00	84.00
Word Perfect 4.1	879.00	659.00
Wordstar	599.00	350.00
Wordstar 2000+rel. 2.0	950.00	599.00
Wordstar Professional	849.00	485.00
Products not listed: call for best		
price	call	call
MODEMS		
NetComm 3+15 m em		\$219.00
NetComm Smart 123A	2	1050.00
WetComm Smart 1234		1290.00
NetComm Smart 2123		
		\$539.00
NetComm In/Modem		\$360.00
NetComm In/Modem 1234		\$1190.00
NetComm In/Modem 123		\$790.00
NetComm Smart 2400		\$899.00
NetComm Smart 1200		\$629.00
ivetComm Trailblazer		\$Call

	IBM HARDWARE	
	SAM Computer Phone Answering	\$660.00
	VoiceCommand	\$1290.00
	Cipher 25MB tape	\$1890.00
	20 MB Drive Card	\$1450.00
	Intel Above Board with free 8087	\$599.00
	Qubie 20MB hard disk	\$1050.00
	Qubie 44MB hard disk	\$2600.00
	Outrie & Pak 36 HKB	\$429.00
	87.06	\$259.00
-	Taxan Sum Vision IV	\$1050.00
	Saura Color 400	\$990.00
	Taxan Super Vision III	\$839.00
	Qubie color monitor	\$699.00
	Irwin 10MB tape internal	\$1150.00
	Irwin 10MB tape external	\$1590.00
	AST 6Pak with Sidekick	\$379.00
	Microsoft Mouse	\$295.00
	Tandon 20MB hard disk	\$1049.00
	Toshiba P351 Printer	\$Call
	NEC P5 Pinwriter	\$1800.00
	NEC P6	\$880.00
	NEC P7	\$1190.00
	NEC ELF Spinwriter	\$799.00
	Brother M1509	\$829.00
	Epson LQ1000	\$1490.00



Prices apply to stocks held as at 1/10/86.

Availability may be limited at prices advertised.

Call for specials and sales-tax exempted prices: (02) 212-6933, Call in, order by phone, or send cheque or money order to: DISCWARE, 5th floor, 3 Smail Street, BROADWAY NSW 2007 TLX: AA23509. For all products not listed call (02) 212-6933. Viatel \* 778 000#

## Reliability...

## so often overlooked ...

#### Reliability of your computer system should be your No.1 priority . . .

If you judge a computer by its cover, you'll probably choose an Italian product . . .

If you are looking for the lowest initial outlay, you might look to Taiwan ... or for a big name try America.

But, if you don't want to be without your system for days on end ... if you recognise that a powerful and reliable system saves time and money in the long run ... then you'll know that the truly "intelligent" choice — the **reliable** alternative — is NEC.

#### NEC — No. 1 in printers in Australia

It's Japanese workmanship and quality control that have made NEC printers the top selling printers in Australia, and little wonder when tests show they run for 5,000 to 7,000 hours on average between failures! Talk to A.T.S. COMPUTING about our low, low prices on NEC printers such as the new P6 and P7. Just compare — features such as 8K buffers, 19 internal print fonts, quiet mode, double height and triple width, 77 c.p.s. letter quality in proportional spacing, automatic right and left justification no matter what you print on the line, automatic centering ... above all, quality and reliability at an unbelievable price. Then there is the new P5XL with multistrike ribbons — an absolute masterpiece that virtually eliminates the need for daisy wheel printers.

#### **NEC APCIV** — total compatibility

And that same reliability is to be found in NEC computers such as the new APC IV. Featuring complete hardware and software "AT" compatibility, the APC IV has a 40 Megabyte quick access hard disc, 1.2 Megabyte floppy drive, colour monitor and three levels of graphics to choose from. Phone for a quote — no-one will beat our prices!

#### Improvements to the APC III

Former "Computer of the Year", the APC III goes from strength to strength with its software library expander and now 1.2 Megabyte floppy disc drives on 20 Megabyte systems. With fast back-up software these drives virtually eliminate the need for expensive tape back-up units.



#### APC IV

#### **FREE** integrated software

If you buy an NEC computer and printer at our greatly discounted prices, you'll receive at no extra cost "ENABLE Learn" integrated word processing, data base, spreadsheet, graphics and communications software.

#### **NEC** for total support

Yes, for a modest fee NEC provides comprehensive hardware and software support throughout Australia, and we at A.T.S. COMPUTING supplement such support on top quality software such as Enable, Effective Business Accounting and our own low cost A.T.S. Practice System for the medical and dental professions.

#### A.T.S. COMPUTING for best prices

As one of Australia's largest authorised NEC dealers we buy best and sell best. That means savings which could run into thousands of dollars on complete systems. In fact, our prices are so low that many other dealers buy from us and we welcome trade enquiries.

Whatever your needs please phone your state branch of A.T.S. COMPUTING for an obligation-free discussion and quote . .

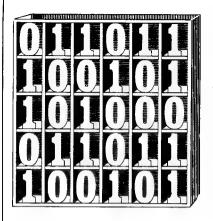


N.S.W. (02) 858 5999 VIC (03) 690 9196 S.A. (08) 51 3947 QLD (07) 221 6198 W.A. (09) 328 2972 MAIL ORDERS: 1039a Victoria Rd., West Ryde N.S.W. 2114

### A.T.S. COMPUTING

"Advanced Technology + Service"

#### **SUBSET**



David Barrow presents more documented machine code routines and useful information for the assembly language programmer. If you have a good routine, an improvement or conversion of one already printed, or just a helpful programming hint, then send it in and share it with other programmers. Subroutines for any of the popular processors and computers are welcome but please include full documentation. All published code will be paid for. Send your contributions to Subset, APC, 2nd Floor, 215 Clarence Street, Sydney 2000

#### DATASHEET FORMAT

You will notice a few changes in the format of SubSet datasheets this month.

The main improvement is that the line width has been increased from 64 to 72 characters, allowing for labels of up to eight characters, and the longer operands and object codes of 68000 and 8086.

The wider format also gives scope for more descriptive section headings in the documentation — 68000 programmers will know whether stack usage is

in bytes or words, and topflight Z80 coders like John Hardman will now cease to confuse clock cycles (that is, time states) with machine cycles.

One change that is long overdue - according to an erstwhile frequent contributor who wishes to remain anonymous - is the standardisation of the Action section. This is now renamed 'Structure' and gives (where possible) a language-independent formal description. Braces enclose iterative clauses (FOR, UNTIL, WHILE) and square brackets enclose the selective process (IF) with the vertical bar separating 'then' and 'else'.

#### 6809 BYTE Queues

QPUT and QTAK (datasheet one) from Stephen Smith are straightforward queue manipulation routines.

Queues are first-in, firstout (FIFO) data structures, and need pointers to both the next write and next read locations. Data is inserted at the queue's tail and read from the head of the queue. This has the unseemly effect of the head chasing its tail through all memory, unless a control system is imposed to loop both head and tail back to the start of queue memory when the allotted maximum extent is reached. Such control causes the effect known as 'wraparound' where the lowest

address byte is logically consecutive to the highest address byte — an effect that occurs automatically on 256-byte chunks of memory situated on a single page of memory and indexed by a single byte. Since the size of queues accessed by QPUT and QTAK does not necessarily correspond to this fortuitous circumstance, the head or tail index needs to be adjusted modulo QMAX whenever a queue read or write occurs.

The routines work only on byte data with maximum queue extent of 255 bytes, but the method is applicable to larger queues. This would entail using 16-bit indices and, perhaps, utilising the Y register as a pointer for transferring data strings between the queue and some other area of memory.

#### DATASHEET 1 ;CALL: QPUT Write one byte to a wraparound queue structure, adjusting pointers, or return queue full information. CALL: QTAK Read one byte from a wraparound queue structure, adjusting pointers, or return queue empty information. (System & Language independent description) CONCEPT Wraparound queue. :Data Structure Header information: (1) Number of free bytes. (2) Tail index (write index). (3) Head index (read index). Other information: Maximum queue size. ;Prog. Structure (for write, with read alternatives in parentheses.) IF queue is full (empty) set full (emptu) flag. IF tail (head) index > maximum queue extent reset tail (head) index to lowest queue address. write (read) indexed element. increment tail (head) index. decrement (increment) free byte count. clear full (empty) flag. :SYSTEM (System implementation requirements) Processor ;Hardware need Queue in RAM. :Software need None. PROGRAM (Specific coding and operation details) addresses queue header information. A contains byte to be written to queue. QTAK: X addresses queue header information. Queue must be initialised or active. Queue format: byte 0,X: no. of free bytes 1,X: tail index (1 to QMAX). 2,X: head index (1 to QMAX). 3,X to QMAX+2,X: queue data bytes. Output state QPUT: Z=0: Byte written. Queue indices updated. X addresses written byte. B = gueue index to written bute. A is unchanged. Z=1: Queue full. A, B, X & queue unchanged. QTAK: Z=0: A = byte read. Queue indices updated. X addresses read byte. B = quaue index to read byte. Z=1: Queue empty. A, B, X & queue unchanged. None (except uninitialised queue structure). :Misuse Errors A B X CC :Register need :Location need Not specific :Program Bytes :Stack Bytes 56 (QPUT: 27: QTAK: 29). Clock Cycles QPUT: 57 (+7 if wraparound occurs). 12 if queue full. QTAK: 59 (+7 if wraparound occurs). 14 if queue empty. SUBSET CLASS (Environmental hazard guide) Interruptable: YES Promable: YES Reentrant: YES Relocatable: YES Robust: YES QMAX EQU :Single bute maximum queue size. **O**PUT LDB E684 :Test number of free butes **OPUTEND** ;and exit, Z=1, if none free

S

◆ ARCHIVE COMPUTER SERVICES, SYDNEY ◆ ARCHIVE COMPUTER SERVICES, SYDNEY ◆

#### CHIVE COMPUTER SERVICES PTY, LIMITED

Microcomputer Products — Sales and Specialists

SHOP 13, MOUNT STREET PLAZA, CALL FOR BEST PRICES MOUNT AND WALKER STREETS, NORTH SYDNEY, N.S.W 2060

Please address mail to P.O. Box 1231,

North Sydney, N.S.W. 2060

SYDN

SYDNEY . ARCHIVE COMPUTER SERVICES.

SYDNEY - ARCHIVE COMPUTER SERVICES.

ARCHIVE COMPUTER SERVICES.

OLIVETTI M24 640Kb Ram.....2 x 360 Kb Diskettes Mono VDU...... MS-DOS

\$3950

640Kb — 20MB Hard Disk Mono VDU..... .... MS-DOS

\$4950

#### BASIC TIME PC/XT

20Mb, 640Kb, Mono.....\$2950 20Mb, 640Kb, Colour......\$3300 20Mb, 640Kb, EGA......\$3700 4.77/8MHz switchable

#### PRINTERS

**EPSON LX86 BROTHER M1109 BROTHER M1509 BROTHER Twinwriter** 

NEC **TOSHIBA** 

#### ORCHID TURBO PLUG IN CARDS FOR YOUR CURRENT PC

ORCHID 286E .......\$1850 ORCHID TINY TURBO ...\$1100 ORCHID TURBO EGA....\$1500

#### IBM COMPATIBLE SOFTWARE

**Microsoft** Access Chart **Project** R. Base

Windows

Sorcim Supercalc 2 Supercalc 3 Super Spellguard SuperProject Superwriter

Word Flight Simulator Multiplan

**Digital Research Access Manager** Assembler P/Tools

**Ashton Tate** DBase II DBase III+ Framework

**Concurrent PC.Dos Display Manager** Gem Desk Top

#### INTERNAL HARD DISKS FOR YOUR CURRENT IBM OR COMPAT.

SEAGATE 20 MINISCRIBE 20 TANDON 20 QUBIE 20

#### THOMSON MONITORS

TTL Mono\$240
RGB .31mm
EGA .31mm\$950
EGA Card\$470

Micropro

Wordstar Professional Wordstar 2000+ Microsoft Excel

Knowledgeman 2 K-Chat K-Graph

K-Mouse K-Paint K-Report K-Text

CALL FOR MORE

DETAILS

YOUR EXPERIENCED PROFESSIONAL COMPUTER DEALER

ry charges extra. All prices include tax. Prices subject to change IBM is a Reg. TM, of International Business Machines

ARCHIVE COMPUTER SERVICES, SYDNEY • ARCHIVE COMPUTER SERVICES, SYDNEY •

#### **SUBSET**

	LDB CMPB BNE	#QMAX 1,X QPUTTAIL	;Else get max queue bytes ;compare with tail index, ;skip if not at max extent,	C6 E1 <b>0</b> 1 26	nn Ø2
	CLR	1.X	else wraparound to start.	6FØ1	
:		,	· ·		
QPUTTAIL	INC	1,X	;Add 1 to tail index.	6CØ1	
	LDB	1,X	;Get tail index and re-≀ndex	E601	
	DECB		;pre-update position.	5A	
	DEC	,X	;Subtract 1 from free bytes.	6A84	
	LEAX	3,X	;Address queue data lowest byte	3003	
	ABX		add index to tail and	3A	
	STA	,X	;write byte to queue tail.	A784	
	ANDCC	#\$FB	;Clear Z to show write success.	1C	FB
;					
QPUTEND	RT5		Exit QPUT.	39	
;					
;					
:					
•					
QTAK	LDB	,X	;Test number of free bytes	E684	
QTAK	LDB CMPB	,X #QMAX	against maximum number	C1	
QTAK	CMPB BEQ		;against maximum number ;and exit, Z=1, if all free.	C1 27	
QTAK	CMPB BEQ LDB	#QMAX QTAKEND #QMAX	against maximum number and exit, Z=1, if all free. Else get max queue bytes	C1 27 C6	16
QTAK	CMPB BEQ LDB CMPB	#QMAX QTAKEND #QMAX 2,X	against maximum number and exit, Z=1, if all free. Else get max queue bytes compare with head index,	C1 27 C6 E1 <b>0</b> 2	nn 16 nn
QTAK	EMPB BEQ LDB CMPB BNE	#QMAX QTAKEND #QMAX 2,X QTAKHEAD	against maximum number and exit, Z-1, if all free. Else get max queue bytes compare with head index, skip if not at max extent,	C1 27 C6 E1 <b>0</b> 2 26	16 nn
QTAK	CMPB BEQ LDB CMPB	#QMAX QTAKEND #QMAX 2,X	against maximum number and exit, Z=1, if all free. Else get max queue bytes compare with head index,	C1 27 C6 E1 <b>0</b> 2	16 nn
;	EMPB BEQ LDB CMPB BNE CLR	#OMAX QTAKEND #OMAX 2,X QTAKHEAD 2,X	against maximum number and exit, Z=1, if all free. Else get max queue bytes compare with head index, skip if not at max extent, else wraparound to start.	C1 27 C6 E102 26 6F02	16 nn
QTAK	EMPB BEQ LDB CMPB BNE CLR	#QMAX QTAKEND #QMAX 2,X QTAKHEAD 2,X	against maximum number and exit, Z=1, if all free. Else get max queue bytes compare with head index, skip if not at max extent, else wraparound to start. Add 1 to head index.	C1 27 C6 E102 26 6F02	16 nn
;	CMPB BEQ LDB CMPB BNE CLR INC LDB	#OMAX QTAKEND #OMAX 2,X QTAKHEAD 2,X	against maximum number and exit, Z=1, if all free. Else get max queue bytes compare with head index, skip if not at max extent, else wraparound to start. Add 1 to head index. Get head index and re-index	C1 27 C6 E102 26 6F02 6C02 E602	16 nn
;	CMPB BEQ LDB CMPB BNE CLR INC LDB DECB	#QMAX QTAKEND #QMAX 2,X QTAKHEAD 2,X 2,X	against maximum number and exit, Z=1, if all free. Else get max queue bytes compare with head index, skip if not at max extent, else wraparound to start. Add 1 to head index. Get head index and re-index pre-update position.	C1 27 C6 E102 26 6F02 6C02 E602 5A	16 nn
;	CMPB BEQ LDB CMPB BNE CLR INC LDB DECB INC	#QMAX QTAKEND #QMAX 2,X QTAKHEAD 2,X 2,X 2,X	against maximum number and exit, Z=1, if all free. Else get max queue bytes compare with head index, ;skip if not at max extent, ;else wraparound to start. ;Add 1 to head index. ;Get head index and re-index ;pre-update position. ;Add 1 to free bytes.	C1 27 C6 E102 26 6F02 6C02 E602 5A 6C84	16
;	CMPB BEQ LDB CMPB BNE CLR INC LDB DECB INC LEAX	#QMAX QTAKEND #QMAX 2,X QTAKHEAD 2,X 2,X	against maximum number and exit, Z=1, if all free. Else get max queue bytes compare with head index, skip if not at max extent, else wraparound to start.  Add 1 to head index. Get head index and re-index pre-update position. Add 1 to free bytes. Address queue data lowest byte	C1 27 C6 E102 26 6F02 6C02 E602 5A 6C84 3003	16 nn
;	CMPB BEQ LDB CMPB BNE CLR INC LDB DECB INC LEAX ABX	#QMAX QTAKEND #QMAX 2,X QTAKHEAD 2,X 2,X 2,X 2,X 3,X	against maximum number and exit, Z=1, if all free. Else get max queue bytes compare with head index, skip if not at max extent, else wraparound to start.  Add 1 to head index. Get head index and re-index pre-update position. Add 1 to free bytes. Address queue data lowest byte add index to head and	C1 27 C6 E102 26 6F02 6C02 E602 5A 6C84 3003 3A	16 nn
;	CMPB BEQ LDB CMPB BNE CLR INC LDB DECB INC LEAX ABX LDA	#QMAX QTAKEND #QMAX 2,X QTAKHEAD 2,X 2,X 2,X 2,X 3,X	against maximum number and exit, Z=1, if all free. Else get max queue bytes; compare with head index, skip if not at max extent, else wraparound to start.  Add 1 to head index. Get head index and re-index pre-update position. Add 1 to free bytes. Address queue data lowest byte add index to head and pread byte from queue head.	C1 27 C6 E102 26 6F02 6C02 E602 5A 6C84 3003 3A A684	16 nn Ø2
;	CMPB BEQ LDB CMPB BNE CLR INC LDB DECB INC LEAX ABX	#QMAX QTAKEND #QMAX 2,X QTAKHEAD 2,X 2,X 2,X 2,X 3,X	against maximum number and exit, Z=1, if all free. Else get max queue bytes compare with head index, skip if not at max extent, else wraparound to start.  Add 1 to head index. Get head index and re-index pre-update position. Add 1 to free bytes. Address queue data lowest byte add index to head and	C1 27 C6 E102 26 6F02 6C02 E602 5A 6C84 3003 3A	16 nn
;	CMPB BEQ LDB CMPB BNE CLR INC LDB DECB INC LEAX ABX LDA	#QMAX QTAKEND #QMAX 2,X QTAKHEAD 2,X 2,X 2,X 2,X 3,X	against maximum number and exit, Z=1, if all free. Else get max queue bytes; compare with head index, skip if not at max extent, else wraparound to start.  Add 1 to head index. Get head index and re-index pre-update position. Add 1 to free bytes. Address queue data lowest byte add index to head and pread byte from queue head.	C1 27 C6 E102 26 6F02 6C02 E602 5A 6C84 3003 3A A684	16 nn Ø2

#### 68000 CHARACTER ROTATION

CHROT68K (datasheet two) from Roger Thomas rotates an eight by eight bit-matrix (eight consecutive bytes) anticlockwise through 90°. The matrix is assumed to represent a character dot pattern, so the routine would be useful in many graphics applications.

At 74 bytes the routine seems large — although, taking only 2536 clock cycles, it's much quicker than the 38-byte 68000 character transposition given in September. Nevertheless, it would still take some two-thirds of a second to rotate all monochromatic characters on an 80-character by 25-line display with a CPU running at 8MHz. With slower clock speeds, larger character matrices and

colour displays, this form of character rotation could be unacceptably slow for changes to more than a handful of characters.

One problem with the 68000 is that shifts and rotations of memory can only be carried out on wordlength data. Roger's solution is to transfer the eight matrix bytes from source to stack workspace through data registers using the 'MOVEP' instruction: 'MOVEP.L Dn,\$00(A7)' writes the four bytes of register not to four consecutive bytes, but to four consecutive words above the User Stack Pointer A7.

CHROT68K uses the USP dynamically to address each byte for rotation, and is above the stack workspace on exit from SRCELOOP. Consequently, it should not be used in any environment where interrupts use the USP, since some or all of the source data will be overwritten.

#### **DATASHEET 2**

CALL: CHROT68K	Rotate an 8-bit by 8-bit character matrix, stored as eight contiguous bytes, by 90° anticlockwise.
:CONCEPT :Structure	(System 5 Language independent description) move 8-byte source to workspace. destination = source.

## \*\*\*70% off!\*\*\*

... off your programming time and effort that is! Sure, there are programming geniuses around, who can remember all the niggly details of syntax and format and get them right every time without checking the manual, but even they make typing errors. Even geniuses spend three times as long debugging as they spend coding.

#### Even geniuses need BASIC a la Carte!

BASIC a la Carte is a universal program generator that produces error-free code and cuts out most of your typing: you select your operations from a hierarchy of menus. No fuss, no muss...and no bugs. Not only is coding speeded up greatly, but debugging is practically eliminated as long as you get the logic right. And on top of all that, BASIC a la Carte generates special subroutines that overcome some of the faults of BASIC and help you create friendly, easy-to-use programs. The output code is compatible with BASICA, GWBASIC and QuickBASIC.

#### BASIC a la Carte speaks your language!

The comprehensive menus, prompts and messages of BASIC a la Carte are in plain English; you have to think in cryptic program code only when you want to do something very unusual, which has to be hand-coded. This is invaluable to those of us who do not program full-time every day and normally have to spend half our coding time wading through the BASIC manual.

#### At \$87.40 it's got to be good value...

What you get is a comprehensive manual and a disk containing a compiled standard version of BASIC a la Carte and an installing program. You also get a near enough unconditional warranty and updates at only \$10 a pop. What you need to have is a PC (IBM or reasonably compatible) with at least one floppy drive and 256k RAM and BASICA or GWBASIC. If you have Quick-BASIC you're in front...

Order direct from

#### **SMOOTHWARE**

"Aldinga". Canoelands Rd. Glenorie 2157 Ph. (045) 66-6170 Enclose a cheque or money order for \$87.40

## TALK TO THE LAN EXPERTS

The Independent Microcomputer Group is one of the leading suppliers of PC-based Local and Wide area networks to many of Australia's largest companies.

If your PC supplier isn't giving you the total picture, call for one of our independent benchmarking tests to be sent **FREE.** 

## THE INDEPENDENT MICROCOMPUTER GROUP

Sydney (02) 221 5044 Melbourne (03) 62 1339 Brisbane (07) 229 5377 Adelaide (08) 223 2505 Perth (09) 322 4456 Hobart (002) 34 4522

#### Lewis LETTER MAGIC

Lewis LETTER MAGIC helps you run your office more efficiently by greatly reducing the time spent writing letters, or finding information. But look what else it can do for you.

With two key-strokes

You have written this much of your letter:

July 16, 1986

Mr J K Smith Marketing Manager XYZ Engineering Pty Ltd G.P.O. Box 12345 Sydney NSW 2001

Dear John

#### With five key-strokes

You can produce a standard letter as quickly as your printer can print it.

- More than just a word processor, LETTER MAGIC includes a powerful database that lets you merge individual details into bulk mailings.
- Produce address labels, reports, simple invoices and much much more.
- Easy to master as the word processor only includes those commands needed to write letters.

Ideal for sales, customer maintenance, clubs & any office that writes letters.

Price is \$399.00 & Tax.

#### **EASY-TO-USE**

All programs are designed to be used by people with no computer training. At all times, 3 lines of the screen are devoted to instructions of what to do next.

#### **DEMOKITS**

For each program you can order a demo kit, comprising the manual and a disk allowing you to test all aspects on your own computer. The cost can be credited to purchase price, within a month.

The programs are available for IBM PC, XT, AT and compatibles and most other MS/DOS and CP/M80 computers.

#### CUSTOM-MADE SOFTWARE PTY LTD

P.O. Box 507 Randwick NSW 2031 Tel (02)399-8566 or 399-8520



Dr Geoffrey Lewis has established a reputation for producing highly innovative easy-to-use application software for micros. He has written top-selling packages for payroll (PAY-PACK), cashbook (CROSS-CHEQUE) and medical accounting (CASEG).

"LETTER MAGIC is my most innovative product. My other packages have taken fresh approaches to activities which everyone knew could be computerised. With LETTER MAGIC I have automated the production of letters. Each user will continue to discover new uses for this program for months and years."

#### TRACK YOUR INCOME & EXPENDITURE

#### Lewis CROSS-CHEQUE

"If ever there was a small software accounting system that could be described as ideal for the very small business, Lewis Cross-Cheque would fit the bill."

Dan Lawrence, reviewer for Your Computer, August 1986.

- Improve your financial control by getting reports about your business at the press of a button.
- Reduce your time spent on preparing your accounts and income tax return.
- Replace your cash book.
- Multiple cheque accounts.
- Bank reconciliation.
- Price is \$280.00 & sales tax

#### CROSS-CHEQUE IS IDEAL FOR

organisations unsuited to general ledger accounting such as

Doctors Shops Farms Dentists Family Businesses Real Estate Agents Service Industries Motor Industry, etc.

### Lewis PAY-PACK

#### **PAYROLL SYSTEM**

- Used by more than 200 Australian businesses in over 35 industries. Customers range from firms with 3 employees through to BHP.
- Includes management of sick and holiday leave.
- Price is \$690.00 & sales tax

To: Custom-Made Software P.O. Box 507 Randwick	LETTER MAGIC	CROSS- CHEQUE	PAY- PACK
Send more information Send demo kit Send full system	□ □ \$36	□ □ \$36 □	□ □ \$60 □
Name:			
Address:		· · · · · · · · · · · · · · · · · · ·	
Telephone:	Compu	uter:	

```
FOR each destination byte (7 to 0)
                     FOR each workspace byte (0 to 7).
                       shift left workspace byte.
                       rotate left destination byte.
 SYSTEM
                   (System implementation requirements) 68000 series.
Processor
;Hardware need
                   8 bytes matrix RAM.
Software need
PROGRAM
                   (Specific coding and operation details)
A0 addresses 8-bute source matrix (lowest address).
:Input state
:Output state
                   Matrix rotated 90° anticlockwise.
                   CCR changed. All other registers unchanged.
:Misuse Errors
                   Interrupt could cause overwrite of stack workspace.
:Register need
:Location need
                   Not specific.
;Program Bytes
;Stack Bytes
                   74
                   (A7): 32
Clock Cycles
                   2536 (68000 timing).
SUBSET CLASS
                   (Environmental hazard guide)
                   Discreet: NO
Reentrant: NO
;--*-*-
                                                              Promable: YES
                                       Interruptable: NO
                                      Relocatable:
                                                              Robust:
         MOVE.L
                   (AØ)+,DØ
                                    ;Get source bytes 0-3
                                                               2018
         MOVE.L
                   (AØ)+,D1
                                    and source bytes 4-7
                                                               2218
         SUBA. I
                   #16.A7
                                    :Clear 8-word stack
                                                               9FFC MAMA MAIA
                                                              01CF 0000
         MOVEP.L
                   DØ,$00(A7)
                                    :workspace & store the
          ADDA.L
                   #8,A7
                                    ;8 bytes to hi-order
                                                               DFFC 0000 0008
         MOVEP.L
                   D1, 400(A7)
                                    butes of 8 consecutive
                                                               03CF 0000
         SUBA I
                   #A A7
                                    ;words above USP.
                                                               9FFC 2020 2028
         MOVE.W
                   #7_DØ
                                    ;8 result bytes count.
                                                               303C 0007
DESTLOOP MOVE.W
                   #7,D2
                                    ;8 source bytes count.
                                                               3430 0007
SRCELOOP ROXL
                   (A7)+
                                    :Left shift (word) next
                                                              F5DF
          ROXL.B
                   #1.D1
                                    :position source bits
                                                               E311
         DBRA
                   D2, SRCELOOP
                                    ;via X to D1(7-0).
                                                               51CA FFFA
          SUBA.L
                   #16,A7
                                    :Reset USP to source.
                                                               9FFC 0000 0010
          MOVE.B
                   D1,-(A0)
                                    ;Store result byte of 8
                                                              1101
         DRRA
                   DØ.DESTLOOP
                                    ;same place source bits. 5108 FFEA
          ADDA.L
                   #16.A7
                                    :Tidu USP workspace.
                                                               DEEC MAMA MALA
          MOVEM.L
                   (A7)+,D0-D2/A0
                                    restore working regs.
                                                               4CDF 0107
         RTS
                                    Exit, matrix rotated.
                                                               4F 75
```

#### 6809 CHARACTER ROTATION

CHROT689 (datasheet three) is yet another character rotation for 6809-based machines. The last one (CHROT in March) performed an anticlockwise rotation of 90° in 48 bytes and 1544 clock cycles. CHROT689, from Roger Fine, does a clockwise

rotation in only 36 bytes and 971 cycles.

Roger achieves the extra speed by cutting the result loop iterations down from eight to four and computing two result bytes in each pass. This ingenious method utilises two inner loops which remove all need for resetting the source pointer: the first loop auto-increments the pointer to the end of matrix RAM and the second auto-decrements it back to the start.

#### **DATASHEET 3**

CALL: CHROT689	Rotate an 8-bit by 8-bit character matrix, stored as eight contiguous bytes, by 90" clockwise.
CONCEPT Structure	(System & Language Independent description) FOR each result word (3 to 0)  FOR each source byte (0 to 7)
	shift right source byte. rotate right result word lo-byte.

#### PURSUIT

#### IBM\* COMPATIBLES

**Bondwell Model 8** Laptop Only \$2,195

#### Series X Computers

- 640K 2 F/Drives Colorcard Multi I/O Card
- AT\* Keyboard
   All Japanese
   6 Months Warranty

from \$1,380

#### ► Series 88 Computers

Configured as above 12 Month Warranty

from \$1,990

#### Package Deals

A wide selection of Package Deals are available including Computer Monitor & Printer

from only \$1,850

11344

#### PRINTERS

r min i i	10		
Epson LX-86			\$499
Epson FX-105			\$959
Star NX-10			\$525
Star NL-10	f	ron	1 \$499
Star SG-15			\$650
Microline ML-192			\$799
Microline ML-193			\$1075
Brother M-1109			\$449
Brother M-1509			\$859
Olympia NP-165			\$550

\*IBM, AT are Registered Trade Marks of International Business Machine Corporation

Phone 51 2353

#### GRIFTON COMPUTER FURNITURE ACOUSTIC HOODS

LEVEL 7, 608 ST. KILDA ROAD, MELBOURNE, VIC. 3004.

MODEL "A" **\$475** 

PRINTER STATION

Designed to match the PC WORKSTATION including paper shelf/castors.

\$135



MODEL "B" \$565

> MODEL MOUNTED ON CASTORS



PC WORKSTATION

Mounted on castors, integral power board, optional side flaps.

#### AUSTRALIAN DESIGNED AND MANUFACTURED

STANDARD FINISH - WHITE MELAMINE/BLACK EDGING (OTHER COLOURS FROM \$25)

OPTIONS COLISTIC HOOD REAR-FOLDING STACKER PRINTER STATION REAR-FOLDING STACKER
PC WORKSTATION SIDE FLAPS (EACH) \$25

**DELIVERY \$15** (Sydney Metropolitan) OTHER AREAS PHONE FOR QUOTE.

PHONE: (02) 450 1406



#### COMPLETE TECHNOLOGY **COMPUTER OPPORTUNITIES**

LITTLE PRICE

SPREADSHEET			UTILITIES				
	New	Our		New	Our	Seagate 20M	
	RRP	Price	DC Bookum	<b>RRP</b> 210	Price 160	NEC 40M a	
Lotus 123		\$CALL	DS Backup	250	210	Tandon 21M	
Twin	283	220	Fastback	130	92	Tandon 42N	
Supercalc4	825	560	Copywrite	115	89	More than 4	
MS Multiplan	444	340	Copy II PC		68	Intel Above	
Javelin	1446	1320	Smartkey	81		Intel Above	
DATABAS	E		Superkey	165	120	Free 8087 w	
DBase II	1043	700	PC Alien	104	82	Hercules Co	
DBase III+	1470	\$CALL	Norton Utilities	185	140	Hercules Gr	
DBase III & LAN Pack	2085	1490	Art Gallery	56	50	Persyst BOB	
Paradox	1470	920	Sidekick (NCP)	155	115	Persyst Com	
Q and A		\$CALL	Trav Sidekick	150	115	Persyst SB 2	
Knowledgeman 2		\$CALL	Systemate	150	98	Persyst Supe	
RBase	1343	999	Typequik	103	\$CALL	AST 6 Pak I	
Reflex	285	220	Newsroom	102	90	AST Advant	
Dataflex	1845	\$CALL	Newsroom Clip. 1	51	42	AST Advant	
WORD PROCE	SSING		Newsroom Clip.2	62	50	AST 6 PAK	
Gem Collection	360	270	Printworks	170	130	AST Rampa	
MS Word	949	710	Printmaster	96	85	AST Rampa	
Multimate 3.31	1035	710	Gateway	199	150	AST Preview	
Multim/Advant	1209	849	Smartstuff	104	82	AST Prevu/6	
Samna III	895	695	INTEGRATED SOF	TWARE		Intel 8087	
Samna Plus	1150	895	Framework II	1295	1020	Intel 8087-2	
Spellbinder	903	695	Logistix	670	550	Intel 8087-A	
Word Perfect	870	659	Open Access II		\$CALL	Intel 80287-8	
Wordstar	559	350	Symphony	1470	999	NEC V30 ch	
Wstar 2000	833	499	Smart 3.0	1463	1180	KB-5151 Ext	
W star 2000+	950	599				KB-5160 AT	
W star Profnl	833	499	ACCOUNTIN		199	EPC-600 Pri	
XYWrite III	675	550	DAC Easy Acetg.	245 49	40	ESC-600 Ser	
		330	DAC easy Tutorial	49		135w Power	
TRAINING			Attache		\$CALL	360k Chinno	
PC Tutorial	90	65	Sybiz Plus	101	\$CALL	1.2M Chinn	
Professor DOS	111	111	Olibiz	484 600	320 480	KIF 4308 Bu	
TurboPascal Tutorial	90	65	Info Business Mgr I		850	KIF 64k Me	
123 Training	167	140	Info Business Mgr II	1075		CONSC	
GRAPHIC			Dollars and Cents		\$CALL	PP16	
Gem Draw	450	360	LANGUAGE			PP128	
Graph Talk	1195	1080	Lattice C	1015	880	PSA6	
Harvard Presentation	833	570	Hi Tech C Compiler	360	300	SP16	
MS Chart	648	499	Hi Tech Macro Assmb	300	250	SS16	
Freelance	690	570	MS Basic Compiler	893	670	SS128	
Formeasy Desk-Top	1198	850	MS C Compiler	1040	780	256k Upgrad	
PROJECT MANAG	GEMENT	-	MS Cobol Compiler	1433	1080	64k Upgrade	
Timeline	895	670	MS Macro Assembler	444	330		
Harvard Tot. Proj. Mgr	1037	699	MS Fortran Compiler	781	585	INTERFACI	
Super Project Plus	825	560	MS Pascal Compiler	669	510	PI-001 Print	
MS Project V.2	871	650	MS Quickbasic Compiler	219	170	RS-232C Sei	
,		050	Clipper Compiler Dbase	1195	920	RS-232C w/o	
Crosstell VVI		100	OPERATING SYS	TEMS		SPC-286 Ser	
Crosstalk XVI	285	180	Concurrent PC DOS 4.1	575	440	MFB-384 M	
Transporter Incl CrTlk	409	320	MP/M-86	513	\$CALL	IOP-002 I/O	
Softerm PC	464	430	Novell Netware	1995	1700	DIB-541 Mu	
Relay	375	320			1/00	XT-286 Turk	
Ascom	505	450	STATISTICS			PRINTER	
BORLAND PRO			Statpak	794	620	HR15/35 Cu	
Complete Range — C	all for pri	ices	SPSS/PC	2110	1840	HR35DD C	
						M1409 Cut 5	
COMPLET			NOTOCV			M1509 Cut 5	

#### COMPLETE TECHNOLOGY

BUSINESS MADE COMPLETE

FOR PROMPT DELIVERY

**DELIVERY EXTRA** WE DELIVER AUSTRALIA WIDE







170A Riley Street, Darlinghurst P.O. Box 1221, Darlinghurst 2010.

Right opposite the Ansett Bus Terminal

M & DTC 1100 2195 and DTC M and DTC 1240 2800 M Voice Coil 42 Meg \$CALL e Bd PČ 720 940 e Bd AT vith Intel Boards 270 olour card raphics card 430 B 16 860 mbo 540 320 ercharger 1200 Plus PC/XT ntage 128 AT 320 950 ntage PAK 320 Premium 512k 920 page PC/XT 256k page 512k AT ew PC/XT 620 1140 320 6 PAK Combo 1020 300 **\$CALL 4**T 490 695 hip **\$CALL** xtended K'brd 220 T-style K'brd 200 rinter cables 30 erial cables 30 220 er supply non FDD 300 non FDD 420 435 Buffer em. expansion OLINK MICROSPOOLERS 390 790 395 410 430 840 de kit 125 le kit 60 CE CARDS 70 iter 70 erial /clock 110 er/Par AT 160 Aulti Fn 260 O card 160 ulti I/O 190 rbo card 750 ACCESSORIES - BROTH ER ut Sheet Feeder 460 ut Sheet Feeder 550 Sheet Feeder 250 M1509 Cut Sheet Feeder 280 2024L Cut Sheet Feeder 460 HR15/35 Tractor Feeder HR35DD Tractor Feeder 210 255 M1109 Tractor Feeder 45

HARDWARE

**COMPLETE RANGE EPSON** PC's and PRINTERS CALL FOR QUOTATION CALL FOR QUOTATION

180

1409/1509 Font and RAM

#### COMPLETE TECHNOLOGY COMPUTER OPPORTUNITIES

SO RIGHT FOR SMALL BUSINESS SOLUTIONS, YOU'D THINK YOU CONFIGURED THEM YOURSELF!

#### OLIVETTI

Olivetti M28 CPU with 80286 chip, 8MHz operation, 1Mb memory, 1.2Mb FDD and 40Mb HDD. Incl keyboard & Olivetti colour screen, DOS & Basic, Oki ML294 400cps colour printer, with Database, spreadsheet and word processing software included.

\$13,200 complete.

### **BROTHER PRINTERS**

	_
HR10 Dual Port 12cps	495
HR15XL RS/CT 17cps	675
HR35 RS/CT 36cps	1395
HR35DD Twinwriter CT	2250
M1109/Dual 100cps	470
M1409/Dual 180cps	760
M1509/Dual 180cps	920
M2024L RS/CT 160cps	1499

#### Word Processing Stand-alone

Osborne PC, 640k memory, 360k FDD, 20Mb HDD, keyboard and Thomson high-res monitor plus Brother M1509 printer, and your software choice of Wordstar, Multimate, Samna or Spellbinder.

\$4,950 complete.

#### THOMSON MONITORS

Green/Amber Composite	230
Green/Amber TTL	260
Colour 14" RGB/VID	630
Colour 14" RGB	725
Colour 12" RGB/VID	810
Colour 12" RGB	870
Colour 14" 36311ID EGA	1040
EGA Adaptor card	30

#### **OSBORNE**

AT Compat & Printer

Osborne AT 80286 CPU, 6MHz operation, 1.2Mb FDD & 40Mb HDD. 512k expandable to 1Mb including Seikosha PB5420 420cps printer.

\$7,400 complete.

#### OKI MICROLINE PRINTERS

ML182 120/33cps 80 cl	465
ML183 120/33cps 136col	720
ML192 160/33cps 80col	775
ML193 160/33cps 136col	1020
ML292 200/100cps Colour	1150
ML293 200/100cps Colour	1450
ML294 400/100cps Colour	2200
ML84 200/50cps 136 Col	1340

#### NETCOMM MODEMS

	\$		\$
PC in modem	430	Smart 1234SA	1595
1200 in modem	720	Smart 1200A	749
2400 in modem	989	Smart 1200SA	889
123 in modem	1049	Smart 2400A	1055
1234 in modem	1300	Smart 2400SA	1190
Smart 123A	1249	Smart 2123A	552
Smart 123SA	1320	Smart 2123SA	599
Smart 1234A -	1520	3 + 12 Auto	415

#### **TAXAN MONITORS**

Green TTL 18KHz	350
Amber TTL 18KHz	360
Green TTL 24KHz	440
Amber TTL 24KHz	440
Super Vision III	990
Super Vision IV	1280
KIF 545 CGA + HERC Compat	450
KIF 3800S RGB TTL CGA	540
Taxan 400 TGA CGA EGA	1260
KIF 4308 (printer buffer)	460
KIF 64k mem expansion	70

#### IRWIN TAPE BACKUP

IMI L DACK	
10M Int for XT/AT	980
20M Int for XT/AT	1120
25M Int for AT	1120
45M Int for AT	1450
10M Ext for XT/AT	1320
20M Ext for XT/AT	1540
25M Ext for AT	1540
45M Ext for AT	1820
DC1000 Tape (per box)	280
DC2000 Tape (per box)	325

#### ADI MONITORS

Mono DM14 amber	\$295
Colour PX2 med-res	\$710
Colour PX4 med-hi	\$810
EGA PX22 super hi	\$1080

#### WYSE TERMINALS

Wyse 50	\$1295
Wyse 60	\$1460

#### **OLIVETTI M24's**

Dual FD 360k, 640k RAM, mono screen keyboard, bus, MS DOS/Basic. \$4400 20Mb HD, 640k, mono screen, k'board and bus, DOS & Basic. \$5100 M24SP 20Mb HD, as above yet with 10 MHz operation. \$5550







#### COMPLETE TECHNOLOGY BUSINESS MADE COMPLETE

DON 221 747

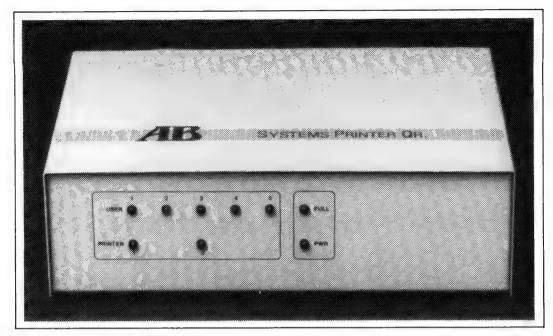
(02) 331 7474
FOR PROMPT DELIVERY

#### DELIVERY EXTRA

WE DELIVER AUSTRALIA WIDE

170A Riley Street, Darlinghurst P.O. Box 1221, Darlinghurst 2010.

Right opposite the Ansett Bus Terminal



**AB SYSTEMS PRINTER QR** designed specifically for office and similar environments, is an intelligent data buffering and queueing device linking 5 or more computers to 1 or more printers.

**AB SYSTEMS PRINTER QR** will allow all computers to be permanently online to the shared printing resources.

Some of the SYSTEMS PRINTER QR features are:

- \*\* Z80 microprocessor controlled circuitry.
- \* 5 computers in, 2 printers out, or 4 computers in, 3 printers out

\* Up to 512K Bytes of memory.

\* Sophisticated character compression techniques.

\* Transparent or fully controlled operation.

\* Printer designation.

\* Permanent printer select and deselect.

\* Multiple copies on 1 or both printers (independent) all by inserting simple codes at beginning of text file.

\* Software and hardwired handshaking.

\* Units can be cascaded to give more inputs and outputs, and increase memory size.

\* Selectable baud rates.

\* An array of light emitting diodes on the front panel allows easy monitoring of the systems activities.

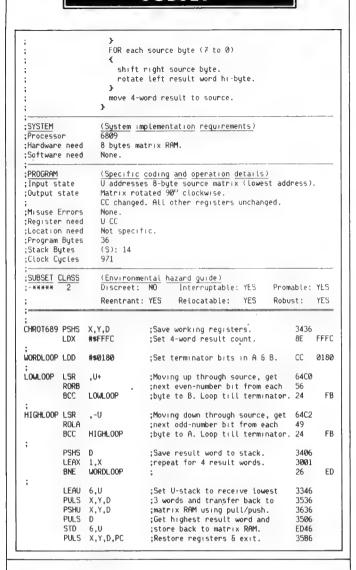
\* Rugged construction — No special environmental requirements.
\*\*\* WHOLLY AUSTRALIAN DESIGNED AND MANUFACTURED

## AB Office Electronics

383 Sydney Rd, Balgowlah, N.S.W. P.O. Box 272, Balgowlah 2093

**Telephone:** (02) 949 7422

#### **SUBSET**





'No wonder the magazine gave it a great write-up — it keeps taking out subscriptions and it won't stop!'

Commodore Computers are now available in the heart of Sydney.

#### THE AMAZING



## THE Cx commodore IBM COMPATIBLE PC NOW 640K/20 MEG ONLY \$2999 Inc. Tax

#### THE NEW 64C AND 128D

#### MICROLINE — OKI PRINTERS

Huge range of Software

PRINTERS! DISKS! PAPER! ACCESSORIES!

Repairs to the complete Commodore range too!

207 Clarence St, Sydney

665 Pittwater Rd, Dee Why

YOUR COMPLETE COMMODORE COMPUTER STORE (02) 29 5088 (02) 981 4941

Mail Orders welcome

Bankcard American Express Visa





### IBM COMPATIBLE 640Kb Ram

## RD DISK

**COMPUTER** INCLUDING **MONITOR** 



**300 BAUD** MODEM ONLY **\$99** 

**640K COMPUTER** TWO DRIVES ONLY \$1399

MONITORS — 12" **GREEN OR AMBER** SCREEN \$180 WITH SWIVEL \$195



BOND! Jn. BY-PASS 63 [02] 389 4922 BIRRELL ST

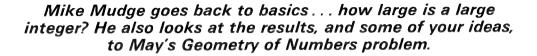
69 Oxford Street Bondi Junction, N.S.W. 2022

QUEENS RO

76 St Kilda Road St Kilda. VIC . 3182

(03) 537 1722

#### **NUMBERS COUNT**



The primary requirement in empirical number theory is to escape from 'the largest integer which can be *handled* is  $2^{32} - 1'$  (= 4294967299) or similar restriction to be found in the user manuals of all personal computers.

Now, what is meant by 'handling' a large integer?

(a) Identification Ideally using a single identifier, as with conventional integers (maybe prefixed by L for 'long'), but possibly using an array-type declaration.

(b) Input and output It is essential to provide a facility enabling a large integer to be input to memory. Such a facility may require the integer to be accompanied by a parameter defining its length, either in digits or some other convenient unit; and should contain a sum-check to detect the majority of keying errors.

The output of a large integer need not be accompanied by the length-defining parameter: however, attention should be paid to formatting in relation to the output device in use. Spurious line-filling characters should be avoided and the conventional form of right justification is desirable, although not essential.

(c) Very simple arithmetic Addition and subtraction of large integers are to be readily available, called through either user-named functions (or procedures) or ideally in the natural manner with + and – linking the appropriate indentifiers.

(d) Simple arithmetic Multiplication of large integers should be carried out with any possibility of unreported overflow removed; in general, reported overflow (Note: since all computers have a finite capacity, overflow is ultimately unavoidable) must be accompanied by termination of the program.

(e) Not-so-simple arithmetic Division: we are unable to subscribe to the philosophy of the eminent number theorist DH Lehmer — 'Not only should division by zero be excluded from arithmetic, but all division should be avoided...' Division should produce a quotient and a remainder, both of which may be very large: a trivial example 1234567898/231 yields 3846005 remainder 293. Decimal places are not relevant and floating-point arithmetic should be avoided in general.

Partial factorisation is a desirable standard subroutine, assuming the

accessibility of a 'table' of prime numbers up to a given maximum. An efficient division routine with a test for non-zero remainder will clearly expedite this procedure.

**Determination of integer roots** (or rational powers). The determination of square, cube, fourth...roots of large integers — only when these are integers — is a desirable facility and can clearly be related to the factorisation algorithm referred to above. For example,  $7 \checkmark (105413504) = 7 \checkmark (2^7.7^7) = 2.7 = 14$ .

A Computation of Devi The following 201 — digit integer had its 23rd root extracted mentally by Miss Shakuntala Devi in 50 seconds. A Univac 1108 computer at The National Bureau of Standards, Washington, using 13,000 pre-programmed instructions, repeated the calculation in one minute!

916748676920039158098660927 585380162483106680144308622 407126516427934657040867096 593279205767480806790022783 016354924852380335745316935 111903596577547340075681688 305620821016129132845546805 780158806771

#### Specimen problem

Input the large integer 123456789101 112131415...n, calculate its  $n^{th}$  power and output this, together with its factors. What is the maximum n which your computer will handle? For example, n = 2,  $12^2 = 144 = 2^4.3^2$ , n = 3,  $123^3 = 1860867 = 3^3.41^3$ .

Readers are encouraged to investigate the efficient manipulation of large integers using techniques ranging from array facilities in high-level languages such as Basic, Pascal or Fortran, through general string handling to machine code/assembler coding. The specimen problem together with the computation of Devi should be attempted.

Achievements may be submitted to Mike Mudge, C/- APC, 2nd Floor, 215 Clarence Street, Sydney 2000, to arrive by December 15, 1986. It would be appreciated if such submissions contained a brief summary of results, together with thoughts relating to the associated outstanding problems, in a form suitable for future publication in APC.

These submissions will be judged using suitably vague criteria, not

necessarily related to the answer to Devi's Computation! A prize will be awarded to the 'best' contribution received by the closing date.

Please note that submissions can only be returned if a suitable stamped, addressed envelope is provided.

Mike Mudge welcomes correspondence on any subject within the areas of number theory and other computationally related mathematics, particularly containing suggestions for future 'Numbers Count' articles, and will endeavour to reply to all letters after a sufficiently long time.

#### Review — The Geometry of Numbers

Relatively few graphics enthusiasts answered the call of May's problem. The typographical error in question five, line three — the word 'lattice' should be deleted — brought rapid response from several careful readers; however, question five, problem E, proved to be too abstract. Further comments relating to it would still be very welcome.

Any reader interested in the mathematical background of this topic is encouraged to consult Minkowski's classic work, *The Geometry of Numbers*. Those particularly interested in question four, problem C, are referred either to C Hylten-Cavallius, 'On a combinatorial problem', *Colloq Math*, vol six, 1958, pp 59-65.

Richard Tindall, a regular correspondent, has dealt effectively with problems A and B, and having confirmed the known results of problem D, has conjectured (without proof) results for n = 8 and 9. Problem C was Richard's chief interest and I feel sure that he would share the details of his approach upon receipt of a stamped, addressed envelope C/- APC.

The prize-winner this month is John Gale with an Epson MX80 and programmed in Microsoft Basic. John's approach to graphical display of lattice points was simple but effective, and his attempts to relate results in the geometry of numbers to rational approximations (best-possible in some sense) to certain transcendental numbers were enthusiastic, if not greatly productive.

END

THE NEWEST VERSIONS. THE MOST RELIABLE QUALITY

COMPETITIVE PRICE FOR YOU LONG TERM BUSINESS,

**ALL KINDS ADD-ON CARD** FOR PC/XT/AT

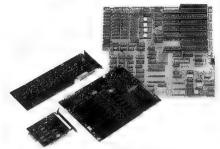


PC/XT/AT COMPATIBLE PORTABLE COMPUTER



#### 14" RGB COLOR DISPLAY MONITOR

- 14CH103: HIGH RESOLUTION.
- 14CM104: MEDIUM RESOLUTION
- 14CH107: EGA COLOR MONITOR



#### PC/XT/AT INTERFACE CARDS.

- ENHANCED COLOR/GRAPHICS/
- PRINTER ADAPTOR.
- RS-232C SERIAL CARD. MULTI-I/O CARD (DISK-I/O CARD).
- 512K RAM CARD.
- DISK DRIVE CONTROLLER(II).
- PRINTER CARD.
- COLOR GRAPHICS W/2 VIDEOPORTS CARD.
- 384K MULTIFUNCTION CARD.
- MONOCHROMEGRAPHICE PRINTER CARD (II).
- FLOPPY DISK DRIVE CONTROLLER(I)

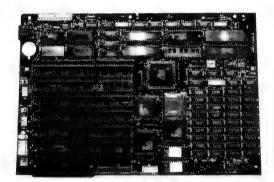
#### PC/AT MAIN BOARD.

- 80286 MICROPROCESSOR, 6/8 MHz.
- IBM RAM ON BOARD.
- 6 PC/AT BUS COMPATIBLE SLOTS AND
- CLOCK WITH BATTERY BACK UP.

#### onder Compek industrial corp.

3FL. NO. 206, 2 SEC. NAN-CHANG RD, TAIPEI, TAIWAN, R. O. C. P.O. BOX. 30-115 TAIPEI TAIWAN TLX: 12811 COMDEK TEL: (02)3964526 3971519

#### XT SIZE AT SYSTEM BOARD



- \*4 layer circuit board.
- \*Used 5 customed chips. \*Intel 80287 optional.
- \*Intel 80287 optional.

  \*1MB memory on board.

  \*27128 or 27256 chips for BIOS and BASIC ROMS.

  \*PHOENIX BIOS (optional)

  \*64K Byte Read-Only Memory (ROM) subsystem.

  \*Processing speed 6MHZ/8MHZ switchable.

  \*Dimensions 22 × 23cm same as XT's.

  \*Tataly (ALOM (ALOM ALOR Bytes Bendern Access Memory (I

- \*512K/640K/1024K Bytes Random-Access Memory (RAM) Subsystem.

#### COMPET COMPUTER SYSTEM CO., LTD.

P.O.BOX 26-919 TAIPEI, TAIWAN, R.O.C.

TELEX: 13269 COMPETCO CABLE: "COMPETCO" TAIPEI

TEL: (02) 7038739, 7088274 7059030-1

# C Guard

- · Protects data, software and hardware against voltage surges and AC line noise.
- Against feedback noise generated by peripherals.
- UL approved components.
- Ready to use-Just plug in.
- Maintenance free.



#### FAVORABLE ENTERPRISE CORP.

TELEX: 14714 FAVOR TEL: (02) 7025742

MAIL ADDRESS: P.O. BOX 27-138, Taipei, Taiwan, ROC

#### DIARY DATA

#### Readers are strongly advised to check details with exhibition organisers before making travel arrangements to avoid wasted iourneys due to cancellations, printers' errors, etc.

Sydney

Infotex '86

November 4-6, 1986

Contact: Richard May or Alan Tavt

(02) 959 5555

Hong Kong

Software Exhibition '86

Contact: Nelson Tse,

Tel: (3) 723 5656

Las Vegas, US

Comdex/Fall '86

Contact: Linda Yogel.

Comdex/Fall '86, 300 First Avenue, Needham, Mass 02194, US

Tel: (617) 449 6600

Montpellier, France

IDATE

Contact: Bureaux du

Polygone, Rue des Etatsdu-Languedoc, 34000, Montpellier,

France

Tel: 67 65 4848

Bangkok

SEARCC '86

Contact: TIG

Australia Inc.

8 West St, Nth Sydney

(02) 959 5555

Singapore

Automasia '86

Contact: Australian

Exhibition Services,

Suite 3.3, 424 St Kilda Road

Melbourne 3004 (03) 267 4500

Geelong

**IREECON** 

Contact: Heather Harriman

(02) 29 4051

November 4-6, 1986

November 10-14, 1986

November 17-19, 1986

November 17-21, 1986

November 18-22, 1986

November 30-December 4, 1986

#### LAZING AROUND

#### Brain-teasers courtesy of JJ Clessa.

My wife went shopping last Saturday and bought three items from successive shops. At each shop, the item she bought cost threequarters of the money she had in her purse at the time. She came home with 10 cents only. How much did she have in her purse at the outset?

#### Prize puzzle

This will get the micros whirring.

To multiply 77 by 23, you put the single digit '1' before and after the answer 1771.

To multiply 91 by 32, you put the single digit '2' before and after the 91 to give the answer 2912.

To multiply 411 by 83, you put the

single digit '3' before and after the 411 to give the answer 34113.

What is the smallest number that you could multiply by 29 using this method, and what would be the single digit which you would use?

Answers on postcards or backs of envelopes only, please, to reach APC, Prize Puzzle November, 2nd Floor, 215 Clarence Street, Sydney 2000, no later than 15 December 1986.

#### August prize puzzle

A lot of entries this month - denoting a rather easy problem.

We were rather fascinated by a card from a Mr Wesencraft who claimed that he had a 'truly wonderful proof' that the sum of the first four digits of any answer must be 10 but, unfortunately, his postcard was too small to contain it!

We certainly don't know of this proof but it sounds plausible, and certainly holds for the three answers we have which are:

54748 (the smallest)

92727 93084

The winning entry, drawn at random, came from Mr M Fraser of Sandy Bay, Tasmania.

Congratulations — your prize is on its way. Meanwhile - keep puzzling.

END

#### BENCHMARKS

A list of Benchmarks used when evaluating micros is given below.

An explanation can be found in the February '84 issue.

110 PRIN	K=1 TO 1000 T K
110 PRIN 120 K=0 130 K=K	+1 <1000 THEN 130
110 PRIN 120 K=0 130 K=K 140 A=K	+1 /K*K+K-K <1000 THEN 130

110 120 130 140 150 160	REM Benchmark 4 PRINT "S" K=0 K=K+1 A=K/2*3+4-5 K<1000 THEN 130 PRINT "E" END
110 120 130 140 150 160 170 180	REM Benchmark 5 PRINT "S" K=0 K=K+1 A=K/2*3+4-5 GOSUB 190 IF K<1000 THEN 130 PRINT "E" END RETURN
110	REM Benchmark 6 PRINT "S" K=0

130 DIM M(5) 140 K=K+1 150 A=K/2*3+4-5 160 GUSUB220 170 FORL=1 TO 5 180 NEXTL 190 IF K<1000 THEN 14 200 PRINT "E" 210 END 220 RETURN	10
100 REM Benchmark7 110 PRINT "S" 120 K=0 130 DIM M(5) 140 K=K+1 150 A=K/2*3+4-5 160 GOSUB 230 170 FOR L=1 TO 5 180 M(L)=A 190 NEXTL 200 IF K<1000 THEN 14 210 PRINT "E"	₩.

	RETURN
110 120 130 140 150 160 170 180	REM Benchmark 8 PRINT "S" K=0 K=K+1 A=K 2 B=LOG(K) C=SIN(K) IF K<1000 THEN 130 PRINT "E" END

220 END

## Customers Like the Products, Dealers Like the Commissions EVERBODY WINS WITH THESE PRODUCTS

#### Look into our full range of items:

- \* IBM PC/XT, TURBO, AT COMPATIBLES (COMPLETE SYSTEM)
- \* IBM PC/XT, TURBO, AT MAIN BOARDS
- \* ALL KINDS OF ADD-ON CARDS



Come to us first.

You won't want to deal with anyone else.



Manufacturer & Exporter:

SANWEL-COMP ENTERPRISE CO.,LTD.

P.O. BOX 7-586, Taipei, Taiwan, R.O.C. TEL: (02) 7682170-1, 7660884, 7663346 TELEX: 14618 SANWEL FAX:(886)-2-5634564



## Hales & Rogers (02) 858-5322 SINCE 1977 PTY. LIMITED

ACCESSORIES	
8087 Maths Co-processor	285.00
8087/2 Maths Co-processor	399.00
80287 Maths Co-processor	512.00
Microsoft Mouse with PC Paintbrush	
Qubie 20M byte Hard disc with controller	1120.00
NEC 20M byte Hard disc with controller	1205.00
Hilite DSDD 40TPI floppy discs box of 10	. 26.00
Polaroid Dial N File DSDD floppies box of 10	. 48.00
Centronics to IBM PC printer cable 3m	. 25.00
RS-232 printer cable 3m	

MONITORS	
ADI DM14 TTL input 14" tilt & swivel base	260.00
Taxan 1212 TTL input 12" Green	360.00
Taxan 1213 TTL input 12" Amber	
ADI PX-IV 14" RGB with tilt & swivel base	. 785.00
ADI PX-22 14" RGB EGA with tilt & swivel base	1037.00
Qubie HR31200 14" RGB with tilt & swivel base	
Qubie HR31350 14" RGB EGA with tilt & swivel base	1050.00
Taxan Super Vision III 12" RGB	1015.00

#### MODEMS Le Modem IN Modem - 300 & 1200/75 internal Netcomm 1200 IN Modem 1200/1200 FD internal ..... Netcomm 2400 IN Modem 2400/2400 FD internal . Netcomm 123 IN Modem - 300, 1200 & 1200/75 Netcomm 1234 IN Modem 300, 1200, 2400 & 1200/75 . . . . .

PRINTERS	
Nakajima AP650 Daisy Wheel 13cps	530.00
Brother M1109 80col 100 cps NLQ	400.00
Brother M1409 80col 180cps tractor NLQ	. 705.00
Brother M1509 132col 180cps tractor NLQ	. 795.00
Brother M2024L 132col 160cps tractor NLQ	1560.00
Cutsheet feeder for M1409	. 225.00
Cutsheet feeder for M1509	. 269.00
Cutsheet feeder for 2024L A4 size	
Cutsheet feeder for HR35 & Twinwriter	
Ribbons 80col black suit NP2200 & 80col Epson	
Ribbon Brother M1109 black	8.00
Ribbon Brother M1509 black	20.00
Ribbon Brother HR35 black multistrike	10.00
A4 70gsm printer paper 2000 sheets	45.00
11" x 91/2" 70gsm printer paper 2500 sheets	45.00
11" x 15" 70gsm printer paper 2500 sheets	48.00
102mm x 36mm mailing labels 2000	. 32.00

Try us for the best price on: NEC, Star, Citoh, Riteman, Epson, & Cannon.



#### **BORLAND SPECIALS**

Turbo Database Toolbox	98.00
Turbo Editor Toolbox 9	98.00
Turbo Gameworks 9	98.00
Turbo Graphix Toolbox 9	98.00
Turbo Lightning	10.00
Turbo Pascal Ver 3 8087 & BCD	59.00
Turbo Prolog	29.00
Turbo Tutor 5	55.00
Turbo Word Wizard 9	98.00

We have a few copies of Turbo Pascal Ver 3 @ \$98.00 ea. Turbo is no longer available without the 8087 & BCD option, so grab these while they last.

All prices include the new sales tax on software. We source a huge range of software for the IBM PC. Ring us for a price.

OR

We are distributors for the superb Chendai range of micro-computers. We offer Chendai's professional quality with sales and service expertise at prices everyone can afford. Call us for full details and pricing. Ask about the new Chendai Lap Top with 20MB hard disc.





Phone Orders: (02) 858-5322

Phone your Bankcard or Mastercard order to (02) 858-5322

DELIVERY: \$5.00 per order ANYWHERE IN AUSTRALIA

Address mail orders to:

Mail Orders:

Hales & Rogers Pty Limited, 5 Mobbs Lane, Carlingford NSW 2118 Money orders and cheques should be payable to Hales & Rogers P/L

Warranty: All products sold are covered by the man-

ufacturer's warranty.

Sales Tax: All prices include sales tax. We can supply tax free, please call for prices.

Sources: All products are sourced from the authorised Australian distributor and carry their full support. **Prices:** Are subject to change without notice. Please check before ordering.

Stock: We endeavour to keep stocks of the more popular items at all times. Delivery from our suppliers is usually overnight. Please check our stock first if calling in to purchase.

#### **BEST COMBINATION & BEST PRICE!**



#### PC-501

IBM PC-AT COMPATIBLE SYSTEM

- \* CPU: 80286, 80287 (OPTIONAL)
- \* BIOS ROM: 32KB
- \* RAM MEMORY: 512KB EXPANDABLE TO I MB ON MAIN BOARD
- \* FLOPPY DISK DRIVE: 360KB OR 1.2MB
- \* EXPANSION SLOTS: 8 SLOTS
- \* DISPLAY CARD: MONOCHROME GRAPHIC, COLOR GRAPHIC
- \* KEYBOARD: 84 KEYS, DETACHABLE

- \* INPUT/OUTPUT CONNECTON: ONE SERIAL, ONE PARALLEL PORT FOR STANDARD
- \* METAL CASE
- \* POWER SUPPLY:
- 110/220 VOLTS, 60/50 CYCLES, 200 W
- \* OPERATION SYSTEM: MS-DOS 3.10
- \* WINCHESTER DISK (OPTIONAL) TWO 20MB HARD DISK.



#### PTC-900

IBM PC/XT COMPATIBLE SYSTEM

- \* 8088 CPU 4.77 or 8 MHz
- \* RAM: EXPANDABLE TO 640K or 1MB
- \* EXPANSION: 6 EXPANSION SLOTS
- \* MULTI I/O CARD
- \* DISPLAY CARD: RGB COLOR, COMPOSITE OR MONOCHROME
- \* FLOPPY DRIVE: 5-1/4" FLOPPY DISK DRIVE 360K
- \* PC/XT/AT COMPATIBLE KEYBOARD
- \* ABS CASE (PORTABLE: WITH HANDLE)
- \* POWER: 135W, 110/220V AUTO SWITCHING
- \* CRT: BUILT-IN 9" MONITOR COMPOSITE TTL, GREEN OR AMBER
- \* DIMENSION: 48×44×19 (CM)
- \* OPTION AL SYSTEM: MS-DOS 3.1



#### PTC-286

AT COMPATIBLE PORTABLE SYSTEM

- \* 80286 CPU MOTHERBOARD WITH 512K (80287 OPTIONAL), EXPANDABLE TO IMB
- \* SERIAL/PARALLEL I/O CARD
- \* WDC/FDC (FLOPPY AND HARD DISK CONTROLLER)
- \* COLOR GRAPHIC CARD OR MONOCHROME GRAPHIC CARD
- \* 200W POWER SUPPLY
- \* TWO 1.2MB FLOPPY DISK DRIVES
- \* DETACHABLE KEYBOARD
- \* PORTABLE CASE
- \* 9" DUAL FREQUENCY CRT MONITOR



#### MODERN ...

COMPUTER CORP

4F, 8, SEC. 1, KIEN KWO S. RD., TAIPEI, TAIWAN, R.O.C. TEL: (02)7114900 FAX: (02)7810686 TELEX: 12998 PCDATA P.O. BOX: 32-38 TAIPEI, TAIWAN, R.O.C.

#### USER GROUPS UPDATE

Below is a list of updates and additions to the full User Group Index published in the June issue of APC. The next full listing will appear in the December issue of APC.

#### **NEW SOUTH WALES**

A monthly newsletter/magazine is available for VZ 200/300 users. For more details send a SAE to: Mark Harword, PO Box 154, Dural NSW 2158.

#### ACT

The PC Users Group, Inc (ACT) caters for

16-bit micros using PC/MS-DOS or CP/ M-86. The group meets on the last Monday of each month at 8pm at the Coombs Lecture Theatre, Australian National University, A mid-month meeting is also held (second or third Wednesday, as advised) at the Colloquium Room, Jaeger Building, Australian National University, commencing at 8pm. For more details contact: Secretary, PC Users Group Inc, GPO Box 2229, Canberra ACT 2601, Tel: (062) 80 5954 (Chess Krawczyk, Bulletin Board (062) 58 9967.

The following SIGs operate within the PC Users Group Inc.

NAME OF GROUP:	CATERING FOR:	MEETINGS:	CONTACT:
Sanyo SIG	Sanyo MBC 550/555	Meets on first Monday of each month, 7.30pm at the Blair Room, Canberra Workers' Club.	Sanyo SIG GPO Box 2229 Canberra ACT 2601 (062) 91 6194 (AH) Mike Cassidy
Government Systems SIG	Those working with microcomputers in Parliament, the Judiciary, Government departments and authorities	Meets on first Wednesday of each month at 4.30pm at Silverton Centre, Rudd Street.	Government Systems SIG GPO Box 2229 Canberra ACT 2601 (062) 48 4815, Bruce Rossell
Survey and Statistics SIG	Those using microcomputers for statistical analyses and for preparation and execution of surveys.	Meets bi-monthly	Survey and Statistics SIG GPO Box 2229 Canberra ACT 2601 (062) 97 2697 (AH) Bill Fitzgerald
C Language SIG	C Programmers	Meets on first Wednesday of each month, 8.00pm at the seminar room of the Jaeger Building, ANU.	C Language SIG GPO Box 2229 Canberra ACT 2601 (062) 58 3169 (AH) Cedric Bear
Com SIG	Computer communications	At mid-month meetings.	Com SIG GPO Box 2229 Canberra ACT 2601 (062) 58 9081 (AH) Alan Salmon
CAD SIG	Those interested in CAD applications		CAD SIG GPO Box 2229 Canberra ACT 2601 (062) 30 2508 (AH) Frank Taplin
Open Access SIG	Open Access users		Open Access SIG GPO Box 2229 Canberra ACT 2601 (062) 81 2273, Warren Colledge
Apricot SIG	Apricot microcomputers		Apricot SIG GPO Box 2229 Canberra ACT 2601 (062) 58 6677 (AH) Barry Zazoniuk
Laptops SIG	Laptop microcomputers		Laptops SIG GPO Box 2229 Canberra ACT 2601 (062) 88 0027 (AH) Ray Roche

#### **Amiga Software** MARAUDER II

Automatically backups most protected Amiga Software — Great for hard disk users (Only when licence permits)

#### **GRABBiT**

**\$65** 

Send any screen to IFF disk file or printer, also change screen colours at any time. p&p included, \$140 for both Bankcard welcome

#### IDEAL SOFTWARE

P.O. Box 8336 Alice Springs 5750 Ph (089) 52 8852 (BBS online A/H)

#### VZ200 VZ300 AT LAST

A special book of Programme Listings, Basic and machine code, hardware modifications and more is a must for all VZ200/VZ300 owners and users

VPROGRAMMEZ — VHINTZ —

VHARDWAREZ

Postage included AS18.50 in Australia

We also run Le'VZ 200/300 OOP user group. Newsletter \$1.00 each

SEND S.A.S.E. FOR CLUB DETAILS AND VLISTZ CATALOG. BANKCARD AND VISACARD WELCOME

#### VSOFTWAREZ

39 Agnes St., Toowong Qld 4066 Australia Ph (07) 371 3707



SERVICE SPECIALIST

- \* IBM PC compatibles
- \* Apple
- \* Hardware & software & spare parts
- Dealer enquiries welcome
- \* Free pick-up & delivery (NSW only)
- \* Call us for guaranteed service & support





#### INDEX



#### CONNECTOR

#### **D-SUB CONNECTOR:** SOLDER TYPE, DIP STRAIGHT TYPE CRIMPING TYPE, RIGHT ANGLE TYPE, FLAT-CABLE TYPE 9, 15, 19, 37, 50 male & female.

#### **CENTRONIC CONNECTOR:** STANDARD SLODER TYPE, RIGHT ANGLE TYPE, STRAIGHT P.C.B. INSERT TYPE FLAT-CABLE TYPE 14, 24, 36, 50 male & female.

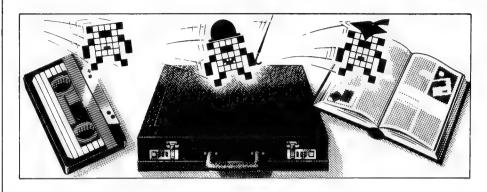
- CARD EDGE CONNECTOR 20, 24, 26, 34, 40, 50 ways for flat cable.
- DUAL ROW SOCKET 10,14 60, 64 Ways for flat cable.
- SINGLE and DUALROW PIN HEADER.

#### ક CABLE

- GPIB. IEEE-488 INTERFACE CABLE.
- RS-232 CABLE.
- CENTRONIC CABLE.
- MODEM CABLE.
- IBM PRINTER CABLE.
- IBM PC/XT, AT DRIVE CONTROL CABLE.







Games

Scientific/mathematic

Business

Toolkit/utilities

Educational/Computer Aided Learning

#### Owen Linderholm selects the best of readers' programs. For details on submitting your own, see the end of this section.

There has been a generally positive response to the changes to 'Program File'. These changes were to introduce more documentation and commenting to make programs easier to understand. In addition, I have tried to have the Program of the Month accompanied by a decent introduction which explains how the program was written and how it works. I'm hoping to extend this policy to cover more of 'Program File', in order that all the long programs are accompanied by documentation which reveals how the programs are written and why the program was written in the way it was.

The hints and tips section of 'Program File' will not be affected, and I hope to continue to receive any snippets of hardware or software knowledge that you have discovered about your machines.

Due to the aforementioned change, readers should send in much more thorough documentation with their programs. It should include information on how to run the program, any idiosyncrasies or alternative versions, reference to machine-specific parts of the code, why the program was written, how it was written, and some indication of why particular algorithms or data structures have been used.

These changes, which will take a few months to implement, should result in 'Program File' beina easier understand and more interesting. So, if you're thinking of submitting anything to Program File, please bear these things in mind.

#### This month's programs

The Program of the Month is an unusual and extremely useful utility written by Jim McCartney. It's called Snoopy, and its purpose is to examine and modify records from all sorts of programs, especially databases. The format in which records are stored can be decoded so that they can be used by other programs or accessed by user-written ones. It can also be used to edit the records and then save them.

The program works slowly and is best compiled by something like Microsoft's QuickBasic. One limitation of the program is that it is designed to be used with fixed-length records. It's still possible to access variable records, but it's difficult to do in a completely organised way.

The program could be used to analyse records, and also as a stepping stone to writing other programs which use records that this program has analysed. File records could then be manipulated in all sorts of additional ways than are provided by the original program.

There's a utility to provide simple disk management functions on a wide range of Commodore computers and disk drives. The program works with the C1541 disk drive, the 1570 disk drive in C64 mode, the Pet disk drives, and with all Commodore computers that drive these disk drives.

For the BBC, there's a program to assist with installing ROMs in the machine, or programs in sideways RAM that are to act as if they are ROMs. The program creates and writes to disk a machine code file that provides the necessary header to install these programs.

There's a large selection of tips this month, including Commodore 64 IRQ

program installation.



Available now from K & C INFOCOM P/L 232A ELIZABETH ST, SURRY HILL Ask about our special software package deal PAL version and wide range of software available now.

Enq: (02) 212 3096 (02) 211 1020

Mon-Fri 10-4.30 Sat Noon

TO THE FIRST PERSON TO SOLVE THE "SULTAN'S PALACE" ON THE **COMMODORE 64-128** 

Come to the Sultan's Palace which only has 31 rooms but has gambling and arcade action along with graphics and text. Each game is always slightly different, and can be solved by many different routes and strategies. Game is available for \$24.95

#### GARRY McCLEARY SOFTWARE

P.O. BOX 24 EMU PLAINS 2750



# Program of the Month

# MBasic Snoopy

by Jim McCartney through through

This program is available electronically through Microtaex 665; software downloading service. It is accessed through Viatel page \*66637\*

In business, one of the regular requests to Micro Support is for special reports from data generated by package programs. Quite a lot of packages will supply you with a report generator for this purpose (at a good price, mind you) and some software houses will tell you the data fieldings, if you ask nicely.

There remains a substantial number of packages with which you can't get at the data easily because you don't know how it's fielded. Admittedly, a session with Norton Utilities may throw some light on it, but the time which needs to be spent in working out double-precision numbers from the hexadecimal usually defeats all but those who have nothing better to do.

The following program is designed as a versatile tool to deal briskly with this problem, on IBM and compatibles — and primarily for Basic-A style random access records — although it can read any DOS files. Besides decoding records, it can also be used to edit text bytes or hex nybles, and save the resulting record back where it came from.

Records may be printed out in a variety of ways.

The program does not include any disassembler facility — it is designed for data.

To get the best out of it, the program should be compiled, because interpreted Basic won't let you handle a string longer than 255 characters and records are handled as strings. Besides, the amount of work it has to do makes it fairly sluggish on a PC or

doesn't insist on it, and if you want to chop, say, a 512-byte record into

convenient 64-byte pieces for easier

XT unless it's compiled, though leaving out the REMs will help. The code uses Basic-A version 3.0, which includes the useful SHELL; but if you don't have this version, you can do without the fancy bits from lines 690–820, which are mainly to save you having to type-in tedious pathnames. To fix this, delete lines 690–830, and make line 820 as follows: 820 M\$="" ENTER DRIVE:/PATH/FILENAME TO INSPECT ": GOSUB 390: CLS: FIL\$=Q\$:"": IF Q\$=""".

390: CLS: FIL\$=0\$: A\$="": IF Q\$=""
THEN END
delete the KILL in 1460, and change
"770" to "820" in lines 1470 and

# Records under Basic-A

2880.

characters (including the text end-of-file marker, Hex 1A) are treated as Using Basic-A, you can open any file part of the data. If it was originally a cord length, you can open it with the you please. Of course, this leads to the problem of finding out what the since there's nothing in the record or checks the file length (LOF) and asks you for the number of records (you out the record length. However, it /ou like as a random access file with doesn't matter if it's a text file, a binary file or a genuine data file. All random access file with a specific reoriginal or any other record length original record length really was, in the DOS to tell you. The program will usually know this), and works Snoopy) an arbitrary record length --(which I have dubbed

handling, you are welcome to do so.

The DUMP facility

format, text format, or both. The more records to the printer in hex program asks you for your printer width to set the WIDTH parameter to an appropriate figure, and assumes sed print. Fig 1 shows a hex and text dump on a payroll record, origifor developing your own applications (what happened to that field?) and for investigation of data corruption There's a facility to dump one or that CHR\$(15) will produce condennally 384 bytes long but broken down into 12 32-byte-lines for convenience. This is also a useful tool problems. Inspection of this type of dump will help you with the analysis, by letting you see the whole record, or several records, at once.

# The analysis

You first select a file and a record length, and a record (default no 1) for analysis. This is displayed onscreen as shown in Fig 2, initially starting at Byte 1. Reading the columns from left to right, we have:

- 1) The byte number.
- The byte value in hex.
   The ASCII text, if appropriate (otherwise a dot).
  - 4) The interpreter string.
    - 5) The interpretation
- of the interpretation

   and at the bottom, a function key
  menu.

The interpreter string is the key to the operation of the program. It's a string the same length as the record, and its initial state is such that any bytes in the record to be analysed whose values lie in the range 32 to 126 are interpreted tentatively as text characters — the same as in the DUMP. It accomplishes this by setting the corresponding byte in the interpreter string to 't'. If you have some undoubted text, you can confirm this by pressing 'T' on the keyboard for each corresponding byte. This will change the letter in

the interpreter string to upper case, which prevents it being overwritten by further tentative interpretations. Should you be working with a text file, the more common text control characters such as CR and LF are displayed (listed in 160–190), or failing this, as in the IBM character set.

The up and down arrows, Home, End, Page Up and Page Down do what you would expect them to do, although the up arrow is a bit tedious at the top of the screen since I have made no special provision for back-scrolling. Entering a letter corresponding to one of the data types below moves the cursor down the corresponding number of bytes.

The program recognises the following data types:

1) Text, as explained.

2) Bytes: that is, numbers in the range 0 to 255.

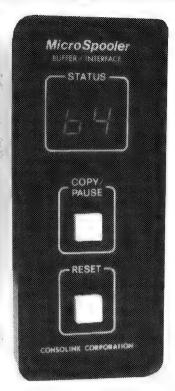
3) Integers: any two consecutive bytes may be interpreted as an integer.

that is, those numbers which you are accounting; things like 3.479167E-16 the maths and accounting formats. In interpret only those numbers in the are ignored. F8 will toggle between the accounting format, numbers outnumbers. Any four consecutive bytes may be so interpreted. However, in order to eradicate improbable numbers, press function key 8; this will side the range are marked as a star. Zeros are not interpreted because there are a lot of them about, range ABS(.0001 to 999999.999 most likely to come across 4) Single-precision floating usually.

5) Double-precision floating point numbers, interpreting eight bytes in the same way.

6) Integer dates (type X) as the number of days from 1.1.1970 to 2000.
7) Ditto (type Y) from 11.1980 to

8) Single-precision dates (type Z)



## MicroSpooler

You no longer have to wait on the printer, as the micro spooler can complete the job in a matter of seconds.

EASY TO INSTALL. EASY TO USE. EASY ON THE BUDGET.

Features include:

\* 16K Mernory: User or factory expandable to 256K.

 Multiple Copy Function.
 Status Readout: Tells you how much data is stored or how many copies are left to run.

\* Pause Function: To let you change paper, make adjustments.

\* Self-Test Routine: Performs a comprehensive check of most internal functions and memory.

★ Internal Power supply: No bulky plug adapters.
 ★ Vertical Mount Configuration and Size: Saves desktop space.

\* Plug-in connections to most computer combinations.

\* Independently selectable Baud Rates on Serial Ports.

Twelve Months Warranty.

\* Four Models: any Combination of Parallel or Serial 1/0.

## Datatracker

- Compare RS-323 interfacing.
- \* Full 25 line cable diagnostics
- ★ Troubleshooting DTE & DCE devices.
   ★ Installation tool for multi-user systems.
- \* Software development & hardware design
- \* 50 input display panel for custom monitoring situations. Features:

\* User friendly layout.

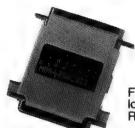
- \* Monitors all 25 pins of both DTE & DCE simultaneously.
- \* High, low, clocking & off indication for all 50
- Visual indication of relative signal strength.
  Built-in crossover capability for pins 2 & 3.
  Complete cable tracing and testing without
- opening hood.





Micro Patch

For permanent on-site or workshop hard wire cabling without solder.



Mini Tracker

For visual indication of high and low signals on commonly used RS-232 pins, (2,3,4,5,6,8,11,20).



Smart Cable

- \* Simple to use. \* Instantly connects virtually all RS-232 computers and
- peripherals. \* No batteries or power supply required.
  - ★ Automatically reconfigures when you plug in different equipment.
- \* Correctly links data lines and handshakes.

## D Office Electronics

383 Sydney Rd., Balgowlah, N.S.W. P.O. Box 272, Balgowlah 2093 Australia

**Telephone:** 949 7422

ger in single-precision format as a which interpret a mathematical intedate in the range 1.1.1900 to 2000.

These are the date formats which I have found in most common use, but there may be others.

ponding letter. At this point, it's a great help to have the data from the ability of any four random bytes Having removed obvious text, you can interpret the rest of the record by pressing ALT with the corresoriginal program printed or written in Press F8 then ALT-S, and you can see at once if there's any accounting data held in single-precision form. ALT-Z is a complete giveaway for that kind of data, because the probcoming across as a single-precision number which is both integer and in the range 1 to 36525 is minute. If you your original data, you can 'fix' any data by pressing the corresponding key on the first byte, without the ALT. This converts the interpreter string to upper case, which is proof tentative interpretations. A dash, '-', tentatively as any of the above types, whatever form it may be available. compare the interpretations with further over-writing with against

When all or most of your record has been interpreted, you can select another record with F6 and see how looks with the same interpreter disables the interpretation of a byte.

any ambiguities. If, instead, you get in a You can dump a screen in the mess, use F7 to restore the original This helps to clear up default interpretation. string.

•

ž

print a message

Q\$=SPACE\$(39-LEN(M\$)/2); LOCATE 25.1; COLOR 0,7; PRINT Q\$;N\$;Q\$;: COLOR 7,0: RETURN

290

GOSUB 280: FOR J=1 TO 10000: NEXT LOCATE 25,1: PRINT SPACE\$(78);: RETURN

message, pause, delete

280: Q\$="": LOCATE 1,1: QZ=A8C(INPUT\$(1)) AND 95:

320

• • • • •

QZ=13 THEN QS="A"
QZ=65 THEN QS="A"
QZ=78 THEN QS="N"
QZ=66 THEN QS="D"
QZ=89 THEN QS="V"

336 356 356 378 388

GOSUB 310: RETURN

•

•

message; Y/N/A/D answer

Q\$=SPACE\$(78-LEN(M\$)): LOCATE 25,1: COLOR 0,7: PRINT M\$;Q\$;; COLOR 7,0: LOCATE 25,LEN(M\$)+1: LINE INPUT Q\$: RETURN 'prompt M\$; input Q\$

GOSUB 390: Q%=VAL(Q\$): IF Q%<L% OR Q%>U% THEN CLS: BEEP: Q%=-1 RETURN

400 426 446

0%=ASC(R1\$): IF Q%<32 OR Q%>126 THEN Q1%=46 ELSE Q1%=Q% RETURN 'text or "." if

AFLAGE-0 THEN PRINT A;: RETURN ABS(A)>A1 OR ABS(A)<A2 PRINT "\*"+BL\$; ELSE PRINT USING P\$;A;: RETURN

THEN

• •

470

486 96

994

• • • •

not

•

A1\$=MID\$(A\$,KZ,8): R1\$=MID\$(R\$,KZ,8):

'reverse chr at cursor

'accounts or maths CLI-CSRLIN: CCIR-POS(0): CAI-CSRLIN: CCIR-POS(0): CAI THEN COLOR 0,7 KLSR COLOR 7,0
PRINT CHR\$(SCREN(CLI,CCI,0));:
IF CAI THEN COLOR 0,7 KLSR COLOR 0,7
LOCATE CLI,CCIR: PRINTED

usual way with PrtSc (Fig 2), but F10 will print the entire record as you see it onscreen. If you come across data which doesn't seem to correspond to any of pect status flags (usually bytes) or pointers or links to other records (usually integers) which may be in the data you put into the record, susother files.

## **Editing**

way as text, but you can change second or third columns (left and right arrows) and pressing any valid text or hex value key. You can also with extreme caution on live data! It numeric data directly in the same numeric data by editing the hex, since you can see the effect on the this respect, the significance of the and downwards — it isn't hard to get You can change the data in the record by shifting the cursor to the edit the number you want by successive approximation, and you'll gain much of floating save changes made by using F9 -number displayed immediately. nybbles increases as you move ţ isn't possible, however, insight into the storage point numbers!

• • • • • convert to upper case 'text if applicable 'interpreter string OPEN DSK\*+"ZZZZZZZ" FOR OUTPUT AS #1: CLOSE: KILL DSK\*+"ZZZZZZZ" GOTO 650 GOTO 650 GOTO 650 GOTO 650 GOTO 65@ GOTO 650 LL.C.(1): PRINT MID\$(STR\$(K],2); byte number LL.C.(2(2): PRINT RIGHT\$(("G"+HEC\$(ASC(R1\$))),2); hex code IF LEFT\$(A1\$,1)=T\$ THEN IF Q%(32 THEN IF Q\$(Q%)="" THEN PRINT CHR\$(Q%);:GOTO 650 ELSE PRINT Q\$(Q%);:GOTO 650 ELSE PRINT CHR\$(Q%);:GOTO 650 IN THEN PRINT CHR\$(Q%);:GOTO 650 GOTO 650 GO PW1=224: PW2=132: IF Q&<>"Y" THEN PW1=136: PW2=80

M\$=SPACE\$(20)+"PLEASE ENTER DRIVE (A to Z) (C> ": GOSUB 390

IF Q\$="" THEN Q\$="""

Q\$=ASC(Q\$) AND 95: IF Q\$<65 OR Q\$>90 OR LEN(Q\$)>1 THEN BEEP:

GOTO 682 ELSE DSK\$=CHR\$(Q\$)+":" IF LEFT\$(A1\$,2)=X\$ THEN GORUB 2120: PRINT DT\$;: A1Z=ASC(MID\$(A1\$,AZ)): IF A1Z>95 THEN MID\$(A1\$,AZ)=CHR\$(A1Z-LCZ) IF LEFT\$(A1\$,2)=1\$ THEN PRINT CVI(R1\$);: LOCATE LI.CI(4): GOBUB 420: PRINT CHR\*(Q1I); LOCATE LI.CI(5): PRINT MID\*(A\*,KI,1); LOCATE LI.CI(6): Q\$="TREE" "+DSK\$+">D1.TMP":SHELL Q\$: Q1\$="\"
OPRN "D1.TMP" FOR INPUT AS \$1
OPRN "D2.TMP" FOR OUTPUT AS \$2
PR.NT \$2.DSK\$ IF LEFT\$(A1\$,1)=N\$ THEN 650 'dp real PRINT BLA;: RETURN NOT BOF(1) OR AX=1 TO LOCATE 3,1 LOCATE 1 PRINT ( 510 520 530 540 550 560 570 98 969 620 9 640 650 99 570 580 582 683 684 586 588 588 798 718 728 730

> • • • • • • • •

136   136   136   137	•	*. 651	RECORD CONTENTS ANALYSIS PROGRAM "SNODY. BAS"  **** McCartney May 1986
ENT :"	•		经营养的现在分词经营的现在分词
", INI	•		/ OFF: FOR J_L TO 10: KEY J_L,"": WEXT IA "MULL","","","","","","BEEP" IA "BACKEPACE","",",",",",",","FF","CR","","","","","","","","","","","","","
": INI	•		TA "","","","","","","","","","","","","",
", TNI	•		
INI	• (		column positions   MOS-"31283138313881388138813881
	• •	·.	GOTO 670

## TAIWAN'S BIGGEST PROFESSIONAL CABINET MAKER



## We have all and we do it all!

An established and well-known manufacture of top-quality products that has built a solid reputation for OEM production to the most exacting specifications. Ling Yih produces housing for your motherboards and all of its peripherals. From stamping and shapping to insulating and painting, Ling Yih controls every step of the manufacturing process. Every month, hundred thousand of computer housings roll off of our automated assembly line. And you have 20 different bezels to choose from. Because, as Taiwan's largest cabinet maker, we do it all, we can offer you the highest quality at the most reasonable price.

Contact us today. We deliver!



LING MH CO., LTD.

9F-3, 57, Fu-Hsing N. RD., Taipei, Taiwan, R.O.C.

Tel: (02)771-7166 Fax: (02)711-3506

Telex: 20232 LING YIH

TOCIOR 7.0: PRINT TOCIOR 7.0: PRINT TOCIOR 7.0: PRINT TOCIOR 820 TE 4 file TOCIO 820 TE 10070 820 TE 10070 820 TE 10070 820 TE 10070 820 TERNGTH ":PL:  GOSUB 400  B 400: RL=QI: POSSIB 120: B 400: RL=QI: POSSIB 120: TERNGTH ":PL:  GOSUB 400  SE="A": TERNGTH ":PL: TOCIOR 0,7: CZ(MI) TOCIOR 0,7: CZ(MI) TOCIOR 0,7: CZ(MI) TOCIOR 0,7: CZ(MI) TOCIOR 0,7: TOC	•	•		•	•	-	•	•	•	•	•	•		•	•	•		• •		•	•	•	•		•	•	•	,	•	•	•		•
12.00.0023   12.0024   1	first page last page	skip interpret	null	byte	date 1970	date 1900   dp real	11 null	11 text 11 bytes	11 integer 11 date 1970	11 date 1950    sp reals  1 dates 1960	il dp resis	F1 = HELP F2 = FND ****	73 = DIR 74 = FILE	FS = A or D FG = RECORD	'F7 = Restart 'F8 = Toggle Accts/Mat	GOSUB 320: F9 = Save rec.	F16= PRINT	Syand bilawni	F=019-7 orthon pubblic		HEX\$ editor	invalid text	TEXT editor		EN MID\$(A\$,A%)=U\$: with the given 1.c.	X%=K%-L%+1: Y%=X%+23:		cursor where it was.	of entry; curs down.				GOTO 1790 : PRINT : GOSUB 490
12.00.0023   12.0024   1		THEN 1450	THEN MID\$(A\$,KI)=N\$: B1X=1: GOTO 1720 THEN MID\$(A\$,KI)=T\$: B1X=1: GOTO 1720	THEN MID\$(A\$,K\(\bigz\) = B\$; B1\(\bigz\)=1; GOTO 1720 THEN MID\$(A\$,K\(\bigz\))=1\(\bigz\); B1\(\bigz\)=2; GOTO 1720	INEN MID\$(A\$FK_)=A\$; BIL=2; GOTO 1720 THEN MID\$(A\$FK_)=Y\$; BIL=2; GOTO 1720 THEN MID\$(A\$FK_)=GS; BIT=A; GOTO 1720	THEN MID\$(A\$,KX)=2\$: B1X=4: GOTO 1729 THEN MID\$(A\$,KX)=5\$: B1X=8: GOTO 1729	e, COO :"-"=\$U WEHT	THEN U\$="t": GOTO 1660 'THEN U\$="b": GOTO 1660 '	THEN U\$=""  GOTO 1668 THEN U\$="", GOTO 1668	THEN U\$="x": GOTO 1660 THEN U\$="x": GOTO 1660	THEN U\$=""d": GOTO 1669	THEN 2220 THEN CLS: CLOSE: WILL "D2. TMD": EMD	THEN CLOSE: CLS: GOTO 770 THEN CLOSE: GOTO 820	THEN 950	THEN A = "": GOTO 1010 THEN AFLAGI = 1 - AFLAGI: GOTO 1680			* INEM 1530 ************************************	48: IF Q\$>9 THEN Q\$=Q\$-7 2 THEN Q2\$=1 ELSK Q2\$=-1 SCREEN (CI\$.CT\$+Q2\$.6)-48: IF 01\$>9 THEN OX	MZ=2 MID\$(R\$ KZ)=CHR\$(QZ"15 + Q1Z)	11D\$(K\$,K\$)=CHK\$(Q12*15	DIT	ΓΑΥ	Redisplay a page complete: current byte: LE = current line.	: IO KL: IF (AMC(MID\$(A\$.A\$.)) AND LCL)>@ TH' 'mubmiltute all non-u.c. characters	1. THEN YERL IL THEN YERL	KZ=XZ TO YZ: LZ=KZ-YZ+1: GC:VUB 490: **:19* FF=F=*		Kedisplay page from current byte to length 669: COLOR 7,08: LIZ-13: KIZ-KZ: YZ-KZ+BIZ:	ALLARA THEN YERKA-LARAA LI THEN YERL KREMI TO YE:	LI=KI-KII-LII: GOSUB 490: .K=LII: KI=KII: LOCATE LI,CI(HI): GOSUB 460	RL KI THEN BILERL KI	IF LEC24 THEN LE-LE-1: KE=KE+1: GOSUB 460: KE=KE+1: GOSUB 460: COLOR 7.0: LOCATE 24,79
######################################	HI.	ŅĮ.	hh	hh			· #	i i		äää	ĥ	M I	ă î	h h !	h						Ī	11	-										
	_ t	COLOR	tories	: ("+( <b>Z</b> Q)	INPUT #1,Q\$: NEXT: CLOSE		: GOSUB 390: CLS:	'is it there? LL FIL\$: GOTO 820	file of length 0 ";FIL\$;" LENGTH ";FL:			WB 320:			. GOSUB 400: RL=QI:	SE NRZ=NR: GOTO 920	< A>": DE\$="A";		:		7 THEN MID\$(A\$,J%)="t" "find possible text	first page	(MX): COLOR 0,7: ATE LI,CI(MX)	%=ASC(Q\$) 'extended codes add 200	cursor left	cursor right down a line	akip Rove	scrol	'up a line 'skip if first	*** aove up one line	no,		on first page already
	Q\$: IF INSTR(Q\$,Q1\$)=@ TH IR(Q\$,Q1\$)): PRINT \$2, DSI IB TMPHT AS \$1: LOCATE 3.3	OLOR 0.7: PRINT " DIRECTORIES	: D%=D%+1: INPUT #1,Q%: ;TAB(35);Q%: WEND: CLOSE	SKLECT DIRECTORY (1 to"+STR\$ OSUB 400: IF QI=-1 THEN 770	FOR INPUT AS #1: FOR JE TO QE:	* SELECT FILE	ENTER FILE NAME TO INSPECT "; HQ\$: A\$=""; IF Q\$="" THEN END	FLE: FL=LOF(1): CLOSE Ma="No such file !": GOSUB 300: KII	1,20: COLOR 0,7: PRINT "ANALYSIS ON	ALMA RECORDS / SIZE	0)+"NUMBER OF RECORDS ? ": LX=0: UX=2 KN 880	N DES="Y": HPN GOODS NOT KNOWN - OK ? <y>"; GOS</y>	FL/NRA: IF RL > INT(RL) THEN DE\$="Y"; OF RECS. IS NOT A FACTOR OF FILE SIZE	THEN 930 ELSE 880 F="RECORD LENGTH IS"+STR\$(RL)+" OK ? <	THEN 950 300)+"RECORD LENGTH ? ": LI=1: UI=32767 PI)-1: TECORD LENGTH ? ": LI=1: UI=32767	NL)+1: IF NK>3Z/6/ OK NR(1 THEN 890 KL	WANT ANALYSIS (A) OR DATA DUMP (D) ?   IF Q\$="D" THEN GOTO 2610	(30)+"RECORD TO ANALYSE ? <1>": L%=0:U% HEN U%=32767 : RNX=Q%: IF RNX=0 THEN RN%=1	**************************************	" THEN 1030 G\$(RL,45): TO RL:	QL=ASC(MID\$(R\$,JL)): IF QL>31 AND QL<12	=5: GOTO 1810 ***********************************	R\$ THEN M\$=PR\$: GOSUB 290: LOCATE L%,C% R\$(SCREEN (L%,C%(M%)));; COLOR 7.0: LOC &: TF O6=""THEN 100CB	\$)=2 THEN Q%=ASC(MID\$(Q\$,2))+2000 ELSE Q	THEN IF HE'S THEN ME-ME-1: GOTO 1850	ACT THEN 1140	THEN 1870 THEN LA=LA+1: KZ=KZ+1: GOTO 1650	GOSUB 460: COLOR 7,0: LOCATE 24,79: PR 3: GOTO 1860	2 THEN 1180 THEN 1870	HEN LZ=LZ-1: KZ=KZ-1: GOTO 1850 GOTO 1810	THEN 1210  L-26 THEN XZ=INT(RL/24)*24+1:GOTO 181	25: GOTO 1610 THEN 1240	24 THEN XX=1: GOTO 1810 23: GOTO 1810
	LINE IMPUT #1, Q#=MID#(Q#,INS D: CLOSE 0: OPEN "D2.TMP" wo	: LOCATE 1,28:C	LK NOT EQF(1) NT TAB(27);DI	1: UX=DX: G	# 04: DI\$	SHELL DI	B=DIR\$+Q1	N "R",#1,	: LOCATE		SPACES (3	QZ=0 THE "NUMBER XE="V" T	QZ: RL=	78="Y"	Q\$="Y" SPACE\$( INT(F) /	( L )	"DO YOU JB 320:	SPACES 12=0 TI 1B 400	IN "R"	A\$<>"	E	=1: 802	M\$C>P INT CH	LEN(Q	0%=27	2000	K2>=RI LX<24	:K <b>Z</b> +1: 3UB 492	Q\$<>27 K\$<=1	L.Z.>1 T	Q\$\c>28 \k\$-L\$>	-KZ-LZ+: 0Z<>27:	KZ-LZ<

#### SMART BABY AT MAIN BOARD

- . MINI SIZE, IBM PC/AT FULLY COMPATIBLE.
- 80288-8 MICROPROCESSOR.
- · BMHZ/BMHZ SWITCHABLE.
- · CHIPS AND TECHNOLOGY PC/AT COMPATIBLE CHIPSET.
- 7-CHANNEL DMA.
- 64KB ROM SUBSYSTEM.
- BATTERY ON BOARD BACKUP FOR CMOS RAM AND REAL-TIME CLOCK.
- . B VO SLOTS:
  - -6 WITH A 36-AND A 62-PIN CARD-EDGE SOCKET. -2 WITH ONLY THE 62-PIN CARD-EDGE SOCKET.
- HARDWARE RESET JUMPER.

#### **ENHANCED GRAPHICS ADAPTER**

- . IBM . ENHANCED GRAPHICS ADAPTER (EGA).
- IBM 
   COLOR GRAPHICS ADAPTER (CGA).
- IBM MONOCHROME DISPLAY ADAPTER (MDA).
- SUPPORTS LIGHT PEN.
- SUPPORTS MONOCHROME & COLOR MODES:
  - 640 x 350 MONOCHROME.
  - 720 x 348 MONOCHROME.
  - 640 × 350 MORE THAN 64 COLORS.
  - 640 × 200 MORE THAN 16 COLORS.
- · SUPPORTS 256K BYTES OF MEMORY USING 64K x DRAMS RAM ON BOARD.

#### KS-1631 MONOCHROME GRAPHIC PRINTER CARD (VERSION II GATE ARRAY)

- KS-1631 IS SUITABLE FOR YOU IBM PC. XT. AT OR IBM . COMPATIBLE COMPUTER.
- PRINTER ADAPTER AND Light PEN INTERFACE.
- 720HX 348V GRAPHICS DISPLAY ON MONOCHROME DISPLAY.
- TEXT DISPLAY
- · GREAT STABILITY.



#### **KEY-STATE INTERNATIONAL CORP.**

2F-2 No. 8, Lane 151, Sec. 5, Fu-Shing S. Rd. Taipei Taiwan, R.O.C.

TEL:886-2-702-8320, 703-6422, 704-9740 TELEX: 13299 KYSTAT FAX:886-2-7022570

ATTN: Chris Lee, Simon Hsu

#### DISTRIBUTOR IN BRISBANE -

#### UNI-X Pty, Ltd.

16-20 Edmondstone Street, Newmarket, Old, 4051

TELEX: AA42211 FAX:61-7-356-8086

TEL:61-7-356-7866 ATT: Ron Thomas

#### DISTRIBUTOR IN MELBOURNE

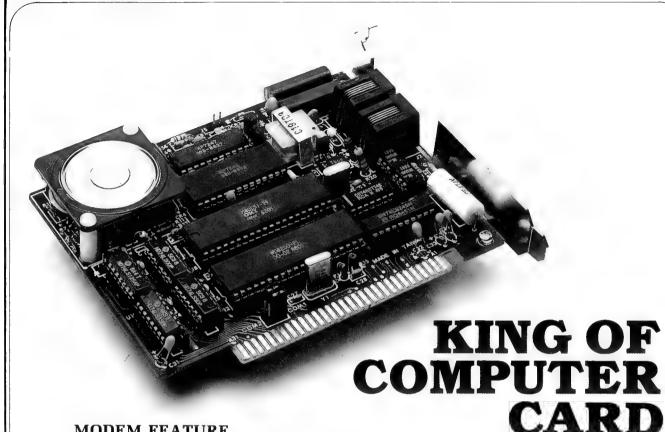
#### Microhelp Computer Advisory Service.

Phone: (03) 4861555 FAX:(03)4862473 361 St. Georges Road, North Fitzroy,

Victoria 3068.

ATTN: Serafino De Simone

•	•		_		_			_	_	_		_		_	_						_		_			_		_			_		_		_			_		_			_		_	_
	•		•	-	•		•	•	_	•		•		•		•		•	•	_	•		•	•	-	•		•			•		•		•	•		•		•		<u> </u>	•		•	•
PRINT "I interprets two bytes as an integer (-32676 to 32767) PRINT "X Interprets two bytes as an integer date; days from 01-01	2000 PRINT "Y Interprets two bytes as an integer date; days from 01-01	0 INT "S Interprets four bytes as an sp real	Tony Jo tim on one of the tony	2 00	PRINT "D Interprets eight bytes as a dp real in maths or accts. r 78)	INI TALL	FKINI "ALT" with any of the above interprets all bytes in the record cribed	PRINT "F7 restores to the default interpretation  2 LOCATE 25.33:PRINT "**** PRESS A MEY *****. OF=WHOFF411. F19	ER FUNCTIONS	PRINT PRINT "The cursor control kews, also Home, Rnd. De No. De Down, act as a		PRINT "The cursor can move left and right between the HEX column, the TE mn	PRINT "and the interpreter column.	PAINT "You can edit the record by changing the characters in the HEX and	columns PRINT "and save your changes with F10.	LOCATE 25,33:PRINT "**** PRESS A KEY ****";: Q*=INPUT*(1): CLS MS="": GOTO 158M		винения в праводника в праводника дила в транции в праводника в праводника в праводника в праводника в праводн	CLS: COLOR 0.7: PRINT "DATA DUMP ON: ";FIL\$: COLOR 7.0: PRINT	OR VAL(Q\$) NRT THEN B\$="Invalid Record Number": GOSUB 300: GOTO 2620	STARTZ=VAL(Q\$) LOCATE 7,1: INPUT "End at record : ".O\$: IF O\$="" OB varioe\.	RZ THEN MS="]	LOCATE 9-11:INPUT "Do you want Text, or Hex, or Both? (I/H/B) :",Q\$:	"	OPEN "R", #1.FILE, RL: FIELD #1, RL AS R\$	LPRINT CHR\$(15): WIDTH "LPT1:", PW1 'condensed print on	"Record length =	LPRINT "Start at byte ";(STARIX-1)*RL+1 LPRINT	11	LERINT LEFT# (JZ)+BL\$,7);		IAMPRICATION HXS;:	NEXT: LPRINT	LPRINT LEFT\$(JZ)+BL\$,7);;		IF DAKSA ON DAILED IMEN DA=45 LPRINT CHR\$(BZ);" ";;	NEXT: LFKINI IF (JL-STARTZ+1) MOD 24 = 0 AND Q5="B" THEN LPRINT CHR\$(12); GOTO 910	$(J_{-}^2-START_{+}^2)$ mod 48 = 0 Then LPRINT CT $J_{-}^2$	LPRINT CHR\$(12): LPRINT CHR\$(18): WIDTH "LPT1:", PW2: CLOSE: GOTO 950	END OF DUMP		********* ERROR TRAP *******	1F ERR=75 OR ERR=76 AND ERL=840 THEN CLS: D%=0: RESUME 7/0 IF ERR=76 AND ERL=686 THEN BEEP: RESUME 682	IF ERR=53 AND ERL=640 THEN MS="No such file!"; GOSUB 300; RESUME 620	IF ERRES AND FERLESSO THEN RESUME 510	IF ERRES AND ERL=1930 THEN RESUME 1940 ON ERROR GOTO 0
2400	-/6 to 2666 2426 PRIN	-80 to 2430	anges (F8)		245@ PR anges (F8)	2460	24/6 as desc	2490	2500	251 <b>0</b> 252 <b>0</b>	xpected.	253@ P	2540		_	2590		2500	2610		263 <b>0</b> 2640		2660	2670	2690	2700	2720	2730	2750	770	0010	98/	290	2800		2820			2860			2870	-	2890 11		2930 01
							•							• • •				.,	•••		., .,	•	• • •	.,,,,				., .,			,	•	,,	.4	•	• 14	••	., .,	, .,			61	2 2	. 61 6	100	N N
	Tecord. Lisacreen line: Kisbyte no., Kisbyte at start GOSUB 460: COLOR 7.0: CLS: Wise": IF XI(1 THEN XI=1					GOSUB 460 LOCATE L%,C%(M%): GOSUB 460		OTOTOTOM IN COMMENSATION OF THE PROPERTY OF TH	LPRINT "ANALYSIS OF "FFLS;"; RECORD LENGTH "; RL;"; REC		A1\$=MID\$	FOR AZ=1	IF A12>95 THEN HID\$(A1\$,A2)=CHR\$(A12-LC2)	NEXT CONVERT LPRINT TAB(CZ(1)); MID\$(STR\$(KZ),2);	LPRINT TAB(CZ(2)); RIGHT\$(("0"+HEX\$(ASC(R1\$))),2); LPRINT TAB(CZ(4))::GASHR 420: LPRINT CHR\$(012);	LPRINT IAB(CE(S)); HID\$(A\$,KE:1);	LFKINI IABICARO));: IF LEFT*(A1\$,1)=N\$ THEN 2000	IF LEFT\$(A1\$.1)=T\$ THEN IF $Q_{\kappa}^{2}$ <32 THEN IF $Q_{\kappa}^{2}$ ( $Q_{\kappa}^{2}$ )= THEN LPRINT CHR\$( $Q_{\kappa}^{2}$ ); ELSE LPRINT $Q_{\kappa}^{2}$ ( $Q_{\kappa}^{2}$ ):	ELSE LPRINT CHR\$(QZ); IF FEFFEASTATION OF	IF LEVI'S (A18, 2)=18 THEN LPRINI CVI(R18);		IF LEFT#(A1\$,4)=S\$ THEN A=CVS(R1\$); GOSUB 2090	If LETT\$(A18)=0)=05 THEN ACUD(RI\$): GOSUB 2090 NEVT: IDDIEN: FF-219: BETTINE 5090		I ABS(A) A1 OR ABS(A) (A2 THEN LIPRINT "*"; ELSE	NR TUKN		BS%=80: B6=7305: B7=CVI(R1\$); GOTO 2150					Dispartents("G"+Milds(SIRS(B7Z),2),4)+"-"*Kidnis("G"+Milds(B6Z),4),2) +"-"+RidHT\$("G"+Milds(SIRS(B7Z),2),2)		The state of the s		PRINT "FI	PRINT	PRINT "F4	oth	PRINT	FRINI "FB	PRINT "F9 Saves the record on the screen (with any changes made) PRINT "F10 Sends the whole record to printer. (use PrtSc for screen	LOCATI	PRINT TAB(33);"INTERPRETATIONS	PRINT I Interprets the adjacent byte as text
1866	1810	1820		1846	6	1850	1870	*	1880	1900	1926	1030	200	1940	1960	1986	1 336	2000	201.00	2020	2040	2050	2070	2040	2100		2110	2136	2150	2160	2170	2180	21.30	2200	2210	2236	2250	2276	2280		2300	on for	2330	on1y) 235@	2360	2380
	•		•	•		•		•				•		•	•		•		•		•			•			_																			



#### MODEM FEATURE,

MP212A compatible: BELL 212A, 103, 113, CCITT V.22A, V.22B, V.21

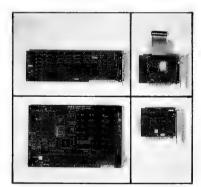
Data rate: FSK (0-300 bps), PSK (1200 bps)

Dialing: DTMF or pulse, adaptive Operation: 1/ half or full-duplex

2/ originate, answer and auto-answer

Over 200 kinds of cards are available for the Apple IIe, IIc and IBM XT/AT. We also carry all parts and peripherals, from keyboards to power supplies, and much, much more. Call us today for factory direct prices to OEMs, dealers and distributors.

- \* MONOCHROME GRAPHIC **CARD**
- MULTI DISPLAY CARD
- PC B.S. COMMUNICATION CARD
- \* PC-APPLE TRANSFER CARD
- 8748-49 WRITER CARD
- \* PAL PROGRAM CARD
- \* SUPER 8 BIT A/D-D/A CARD
- \* 12 BIT A/D-D/A CARD
- \* 14 BIT A/D-D/A CARD
- \* HIGH SPEED CARD (80286)
- \* 8255 I/O PORT



- IEEE-488 CARD
- LIGHT PEN
- 100MHz LOGIC ANALYZER
- MAIN BOARD (6/8/10 MHz)
- ENHANCED GRAPHIC (HERCULES) ADAPTER (EGA)
- FLOPPY DISK DRIVER ADAPTER (1.2MB/360K)
- 3.5MB EXPANSION CARD (NIL RAM, 4 LAYER, EXPANDABLE TO 4MB)
- SERIAL/PARALLEL CARD
- MULTI SERIAL-4 CARD



SUNUP COMPUTER CO., LTD.

P. O. BOX 18-111, TAIPEL, TAIWAN, R.O.C.

TELEX: 24336 AMUNID TEL: (02) 7630106-9

FAX: 886-2-7646301

PRINT\*P - DIRECTORY\* PRINT\*F - FORMAT\* PEM \*\*\* MAIN SECTION 2-0 GETA#:IFA#=""THEN2"0 \*BY C.UHITFIELD\* \*\*\*\*\*\*\*\*\*\*\*\* \*PJSF UTILITIES\* OPEN1,",0,"\*"+D# IFA#="D"THEN420 JFA#="C"THEN400 JFA\*=F"THEN690 IFAS="R"THENB10 IFAG="S"THENBOO GET#1, A# IFA#""THEN450 THIT (CLS). PPINT-ICLS) FORA-11029 60TO 140 PPINT P 41. 91 000 220 | Ú I 062 64 Š ç ۵. در 930 • 11 HELPIZ END 13 PRIMI4 FILEIS DUMPIB REL 17 LEBRRIS HILLIS SAVETIO FM. N.I. 0.00 48 00 41 00 20 20 20 88 88 12 17 86 00 00 00 00 20 00 00 48 00 00 48 00 00 00 48 00 20 00  $3 \in \mathcal{C}$ 4 9 60 .8 9 Fig Fig 88669311121 • • •

rename works by doing the equiva-lent of a POKE directly to the disk via one of the RAM buffers inside it. It and self-explanatory. Most sections would usually be typed-in to perform a function. The exceptions are disk rename and the directory. The disk simply emulate the commands that

isn't possible to change the disk ID using this routine. The directory routine works by PEEKing at the contents of the directory via a RAM buffer.

All the REMs can be omitted when typing-in the program. To stop the program, press RUN/STOP.

PEN \*\*\* DON'T PUT A SPACE BETWEEN 'DRIVE' AND 'NUMBERS' ON LINE 1020 PRINT\*CCLS)COMPACTING NOW.\*:OPENIS,V,15,\*V\*+D4:CLOSEIS:GOTO140 PEM \*\*\* DIRECTORY PPIHITICNICNIPESS APPROPRIATE VEY TO SELECT OPTION\*
PPHHTICNIPESS NUMBER FEYS TO CHANGE DEVICE/DRIVENUMBERS\*
PPHHTICNIC COMPACT DIFFECTORY\* POKE53280,0:POKE53281,0:PRINT"(18)" IFST (A#) / 320RASC (A#) / 128THENS 79 IFASC (A#1/320RASC (A#1/128THEN490 IFA = "0" THE HD = "0"; D=0; GOT 0140 IFA = "1" THEND = "1"; D=1; GOT 0140 REM ### COMPACT ('/ALIDATE) PPINT'S - SCRATCH A FILE" PRIHT'T - REHAME DISK" PRINT:PPINT IFST / OTHERCLOSE1: 00T0650 ATHENCLOSE 1: 90T0650 - REHAME A FILE" IFA\*\*\*8\*THEIP'\*8: 30T0140 IFA#="9"THEN! =9: 3010140 9ET#1, A#: IFA == " THEN5 70 GET#1, A#: JFA#=""THEN600 PRINT: PRINTCHR#/34) ( A4) IFASCIAMICY 34 THEN 570 IFA#=""THEN510 FOPB=1T021 PRINTAGE 530 610 620 630 009 990 o T 200 520 260 580 200 • • • •

# MCROTEX 666 **Julities Commodore 1541 Disk** | by C Whitfield

•

•

• •

This program is available electronically through Microtex 666's software downloading service. It is accessed through Viatel page \*66637#

and should work on all other Commodore machines with 2031, 4040 or been tested on the C64 and Plus/4, even 1571 (C64 format only) disk drives.

The program is fully menu-driven

PRINT: PRINT PRESS ANY KEY.

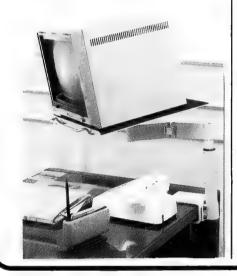
This program should work with any I free the disk drive. Its purpose is to simplify Commodore computer and a 1541 blocks usable and speed up disk housekeeping to make directory listing. The program

Page 226 Australian Personal Computer

## The Right Peripherals & Accessories at the Right Price.

#### Modle 03-34 CRT Arm

- \* Tilt 20° Up/Down
- \* Swivel: 360°
- \* Double Jack Adjustable
- \* Easy Installation
- \* Attractive & Effective



## Model 05-105 K/D Printer Stand For 80 Column Printer

- \* Attractive Style
- \* Easy Installed



## Model 05-200 Printer Sound Cover

- \* Attractive & Effective
- \* Acrylic Cover
- \* With 9cm Cooling Fan
- \* 85% Noise Reduced



## ELEXPO Co., Ltd.

3/F., No. 14, Fu-Shing N. Road, Taipei, Taiwan, R.O.C. P.O. BOX: 34-169, Taipei, Taiwan, R.O.C. TEL: (02)7724758 7414127 TELEX: 13188 ELEXPO FAX: 886-2-7733871

## THE MOST POWERFUL & RELIABLE SWITCHING POWER SUPPLY FOR IBM PC/XT & PC/AT



5050-A 150W for XT

- ★ SINGAPORE AGENT GOH ELECTRONICS (S) PTE. LTD. TEL: 533-5812 TLX: RS34901 GES
- ★ W GERMANY AGENT VASCO OYTEN GMBH TEL. (42 07) 8 18 TLX: 2 45 680 VASCO D



5050-B

150W for XT

6060-A 200W for AT

#### Features:

- \* 115/230 VAC Selectable
- \* Over Load & Short Circuit Protection
- \* High Quality & High Efficiency
- \* Low Output Noise & Ripple
- \* Meet UL, FCC, CSA, VDE Standard
- \* AT "POWER-GOOD" Signal Output
- \* Over 20ms HOLD-UP Time
- \* Soft Start

\*Custom Design & OEM Welcomed!



SUPERMENT ENT. CO., LTD.

P.O.Box 68—2297 Taipei, Taiwan, R.O.C. Tel: (02) 521-0670, 571-2692 Telex: 25702 SPMTCO

• • • • • • • • • • • • • • • • • • 990 PEM \*\*\* STRATCH
OON INFUTFICEFILE TO BE STRATCHED"; S#
OON IFLERICEN'S ATTHET TO BE STRATCHED'; S#: GOTTOP IFLEH COS) '16THENPRINT" (CD3NAME TOO LOWG(CD3": INPUT "OLD NAME"; DO: 60T0620 IMPUT\*NEW HAME ### IF LEH\*N#\\16 THEN PPINT\*(CDINAME TOO LONG(CD)\*:60T01140 IFLER(14) >2THEMPRINT" ID TOO LONG ": GOTO700 PRINT'CCD3RENAMING NOW": FORI=1T01000:NEXT OPENIZ5,0,15,"P\*+P\*+":"+N\*+"-"+0\* 1000 PRINT\*[CD1PENAMING NOW."

1010 BB="#;FORL=1T018:BB==BB+CHR#/160):ME~TL OPEN15, 1, 15, "N" +D&+"; "+N&+", "+I& 910 PRINT"ECDIARE YOU SUPE (Y/N) >= 920 GETA#;IFA#="Y=THEN950 930 IFA#="N=THEN140 1020 CS=LEFTS/LEFTS/NS,161+BS,18) 1110 GOTO 140 1120 BEN \*\*\* NAME INPUT POUTINE 1120 PPINT\*(CLS)\* 1140 INPUT\*(EW HAME\*14\* 1150 IF LEH\*N®\\16 THEN PPINT\*(C 960 OPEHIS,",15,"S"+P4+";"+S4 970 CLOSEIS:60T0140 980 REM \*\*\* DISK PENANE PRINTWIS, "U2: ";5;D;18;0 PRINTWIS, "I"+D\* CLOSES:CLOSE15 PRINT"[CD1SCRATCHING NOW. INPUT"ICLESCOLD NAME": 04 760 PRINT\*FORMATTING NOW\* 700 OPEN15,<sup>1</sup>,15,\*N\*+D&+\*: 780 CLOSE15 790 GOTO 140 GETB#: IFB#=""THEN660 REM \*\*\* FILE REHAME OPEN5, 9, 5, \*#" 1030 OPENIS, 9,15 990 GOSUBILI30 RETURN 1100 900 8830 880 980 980 920 930 940 950 ć. • • • • ٠ • • • 

BBC ROM Header by David McKay

MCROTEX 666

This program is available electronically through. Microtex 666's software downloading service. It is accessed through Viatel page "66637#

One of the more powerful features of the BBC machines is their ability to support paged ROM software. This is 6502 machine code held in ROM, EPROM or sideways RAM, which has been assembled to run in the area 88000 to &BFFF. The operating system can handle up to 16 of these

aids), or both.

Paged software presents the user with the ability to write his own set of routines and store them on disk to

it stands can only take four. Only one

ROM is paged-in at a time. The most

common of these is Basic, followed

ROMs, although the motherboard as

be loaded into sideways RAM or to blow as his own EPROMs. This means that the commands added are always available and do not encroach on any of the precious 32k BBC owners get by on. But for the ROM to be recognised and treated as such, it must conform to certain protocols and function under certain criteria laid down by Acorn.

To illustrate this, presented here is a program which will generate the header for any service ROM. This is a ROM which provides, DFS-like, a new set of \* commands. By inserting your own ROM name, copyright messages, and so on, the program is easily customised. Also included are routines to demonstrate how the ROM can cater for \*HELP and \*'command' requests. These are handled intelligently, the routines accepting either form of request in upper, lower or a combination of cases, with or without an abbreviation.

Two trivial commands are included to show you how they are implemented. These are: \*POP, which gives a little bleep; and \*HOME, which sends the cursor to the top-left corner of the screen without clearing the display. (These commands are the same as Basic's VDU 7 and VDU 30 respectively; they are for purposes of illustration rather than power, but one advantage is that they can be issued from non-Basic environments.)

All ROM headers are identical in format but differ in content, as you'll see. The format is as follows. The first six bytes take the form of two JMP statements: one to the language entry point of the ROM, which we don't deal with here; and the second to the service entry point.

The next byte specifies the ROM type, depending upon which bits are set; for our purposes, this will contain &82. This is because bit one must be set, which gives &02, and

bit seven is set to signify that the ROM has a service entry. This gives &80, and added they give &82. If bit six were set, the ROM would have a language entry too (this byte would contain &C2).

Byte seven holds an offset that points from &8000 to the byte containing zero which precedes the copyright message. Byte eight contains a version number, which doesn't do anything apart from inform people which version of the ROM they are examining.

ROM they are examining.

The title of the ROM is held from byte nine onwards, in ASCII, terminated by a zero byte. Right behind this comes (if there is one at all) a version string, a literary equivalent of the version number. This is followed by a zero byte and the copyright string. Due to the various lengths of the preceding strings, the location of this is going to differ from ROM to ROM; hence the need for an offset held in a known address that the operating system can look-up, then use to find the copyright string.

This is important because there must be a copyright string, even if it's the minimum (C). If these characters are omitted, the ROM is not recognised as a valid ROM. The copyright string usually has something like '(C) Dr Dupree 1986'; the message is terminated by a zero byte. If there's going to be a second processor relocate address, it would followon here, but we won't need one. They are for languages which need to be copied across to a specific address in the second processor.

Unrecognised operating system commands are offered to the paged ROMs in order of priority (&0F down to &00) and if the command is still unclaimed, then the disk is searched for a file of that name. The command is stored at a location pointed to by &F2 and &F3, plus an offset held in the Y register. The ROM is given a

#### **DON'T MISS AN ISSUE!**



#### NEW DESIGN FOR PC/AT/XT COMPATIBLES

#### Computers and Add-On Cards for PC/XT/AT Compatibles

SI-8000 for IBM PC/AT Compatibles SI-3005T PC/XT Turbo Compatibles

- AT/XT Main Board (6-8-10-12.5 MHZ)
- . AT, XT 1.2 MB Floppy controller
- . AT H.D.D./F.D.D. Adaptor
- AT 2.5MB, 3MB RAM Card
   AT 2.5MB, 3MB, 3.5MB Multifunction Card
- XT Multi I/O Adaptor
- AT, XT 384, 512, 640KB RAM Card
- AT, XT Eprom Writer (2716 to 27512A)
- · AT, XT Serial/Parallel Adaptor

- AT, XT E.G.A. Card (720 x 348)
- Multi I/O Video FDD Card
- Short Type HDD Controller
- Multi Display Card
- . Mono/Color Graphics Display Card

NEW!





Manufacturer & Exporter

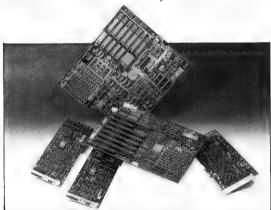
SAILING STRONG INTERNATIONAL CO., LTD.

Office: 5-5F, 191, Fu-Shing N. Rd., Taipei, Taiwan, R.O.C. P.O.Box 18—105 Taipei, Taiwan, R.O.C. Fax: 886-2-7213094 Tel: (02) 716-7737, 716-2841 Telex: 10318 SITNL Factory: No. 47-1, Pao Shin Rd., Shintien, Taipei, Taiwan, R.O.C.

IBM PC/XT/AT are registered trademark of IBM Corp

#### OUR PRICES ADD MORE SELLING POWER TO YOUR COMPUTERS

COME WITH US, YOU WILL ALWAYS BE THE LEADER



#### 16 BIT PERSONAL COMPUTER (PC-1600) PC/XT COMPATIBLE

- Keyboard available in English, German,
  - French, Spanish, Danish, and other language.
- ADD-ON CARDS FOR PC/XT/AT: AT Board (XT SIZE)
- 640K Main Board
- Turbo Board
- Multi I/O Card
- Mono/Graphic/Printer Card
- EGA Card.
- Color/Mono/Graphic/Printer Card
- 80286 Speed Card

- Color or mono/graphics card selectable
- Supports 10MB or 20MB hard disk.
- D-Link Card
- Multi User Card (for AT) IEEE 488 Card
- 2.5MB Multifunction Card
- Serial/Parallel Card
- Color/Graphic/Printer Card And many more!
  - \*OEM/SKD requests welcome.\*



P & C SHITEN ENTERPRISE CO., LTD. RM 7 8FL NO 100 ROOSEVELT RD, SEC 3 TAIPEI TAIWAN ROC CABLE PCSHITEN TLX 19206 PCSHITEN TEL (02) 395 1400 POBOX 30-291 TAIPEI TAIWAN ROC



service call with &04 in the accumulator. It then scans the command and compares it with the commands it responds to. It either performs the function and exits, telling the other ROMs that the command has been dealt with (by storing &00 in A), or exits and passes the chance of execution to the next ROM down the

\*HELP causes a similar service call, with &09 in the accumulator. The ROM must print out its name and, by convention, another word (or pair of words for some ROMs) slightly indented from the left margin that the ROM can give further help on. The service call is then passed on down to the next ROM. Some ROMs of course, don't offer any further help, and just print their name.

help, and just print trief name.

If it's a specific \*HELP request, asking for help from one, and only one, ROM — for example, \*HELP DFS, then the ROM can do one of three things. If the request is for another ROM, it can pass the request on; if it's for itself, it must give the extra help then stop the service call going to other ROMs; or it can print out its name as before and pass on the call. The program as set up does the latter.

The code is assembled at &4000 as if it were being assembled at &8000. The service call causes control to JMP to CHECK, where the accumulator is examined. If it contains &04, the commands are examined; if it contains &09, the help check routine is used. If it's neither, control is passed back to the operating system with the accumulator intact, ready for the next ROM.

The help-checking routine is entered at HLPCH, saves the registers and checks to see if the request was

for this ROM, printing either a small help or large help output. The registers are restored and the ROM exited, with either the accumulator intact or zeroed, depending on the action performed by the ROM.

The command check functions similarly, deciding whether the request is to be performed by this ROM, getting the address of the command location if it is, and JMPing to it. The ROM is then exited with the accumulator set to zero. Otherwise, the service call is passed on.

The commands are stored in a lowed by the high byte and low byte of the address at which the code that This is set up automatically by the program. The bottom of the table is marked by &FF, a pseudo-negative New commands are easily enced by the label that you used for the location at which the command table, with the ASCII command foladded in the format shown, inserting just look at the program: it really is executes the command is located. the name and address bytes, refercode resides. If this sounds fierce, byte. easy.

The program is liberally commented and spaced out, but you can leave out the comments when you type it in. Put in the title you want, and alter the HELP tables to give the details you need.

When RUN, the program generates the necessary 6502 code header and then \*SAVEs it under a filename you've been previously prompted for. You are told the length of the code, and reminded that \*LOAD filename 8000 will insert it into the sideways RAM. The code, if it performs correctly without debugging, is ready to be blown into an EPROM.

• • • • • • • • • • • YES, CHECK IF FOR THIS ROM NO, IS IT A HELP YES, CHECK COMMAND LIST CATER FOR ABBREVIATIONS CHECK REQUEST AGAINST TITLE, CATER FOR LOWER CASE LETTERS BY SETTING A TO ZERO IS IT A HELP REQUEST ; NOT THIS ROM, PRINT OFFER HELP REQUEST TO THE OTHER ROMS BY NOT ALTERING A RESTORE REGISTERS RESTORE REGISTERS FORBID OTHER ROM: ;NO LANGUAGE ENTRY ;SERVICE ENTRY :COMMANDS ONLY :PRINT SMALL HELP NO, SO LEAVE ROM IS IT A COMMAND PRINT FULL HELP SAVE REGISTERS EQUS " MUST have the bracketed" EQUS " capital C at least." EQUS "(C) copyright message" "DEMO ROM VERSION 1.0" NAME ONLY ROM EXIT EOUB HERE-LANG "DEMOROM" BTEXT, X LTEXT, X LDA (&F2),Y CMP TITLE, X CMP TITLE,X (&F2),Y LARGE EQUW 8,0000 SNE SMALL BEO NXLET BLOOP &FFE3 LLOOP &FFE3 SLOOP JMP COMCH IMP HLPCH \*800 8800 **₽&**⊌9 OUT 8800 LOUT SBC #820 8.2E 1805 **8**800 # 8.00 LDX #800 BOUT EQUB &82 801 800 EQUB & BOO EQUB & BOD CMP #804 BNE HPCH 0%=&4000:P%=&8000 EQUS EOUB EQUB EOUS INX 'DA DA. CPX BCC LDX PAQ. LDX CMP BEO SR INX PLA ray Pla PLA RTS PLA INX BEO JSR FAX LAY CMP SNE CMP 3EQ CMP PHP OPT PASS COPYRT VERSTR OFST. TITLE HLPCH BLOOP NXLET LLUOP TYPE LARGE SMALL SLUOP HPCH LANG SERV HERE BOUT LOUT TUO. 550 570 530 470 610 550 990 570 989 969 120 730 750 220 230 240 240 250 250 270 280 280 290 320 330 340 350 420 450 96 900 20 530 540 290 900 380 390 400 • • • • • • • • • • • • •

an EPROM.	
to be blown into	r RUM CODE "FL\$
and checks to see if the request was   to be blown into an EPROM.	REM ROM HEADER CODE MODE 7 PRINT:INPUT "Filename for RUM CODE "FL\$ FOR PASS=4 TO 6 STEP 2
and checks to	10 20 30 40

•

## **Quality Products Make Great Sales!**

#### SC-8000 PC/AT compatible

- INTEL 80286 CPU
- LEGAL SYSTEM BIOS
- MSDOS3.1 BY MICROSOFT
- OEM/SKD INQUIRIES WELCOMED

#### We offer:

SC-8000 Advanced technology personal computer SC-600T Allegro model high speed turbo XT SC-600 16-bit personal computer

A full range of enhanced add-on cards for IBM PC/XT/AT compatibles are available now!

\* IBM PC/XT/AT are registered trademarks of international Business Machines Corp.

\* MSDOS is a registered trademark of Microsoft Corp.

USA OFFICE: COMPUTER SYSTEMS NETWORK INC. 900 SOUTHWEST PARKWAY EAST SUITE 100, COLLEGE STATION, TX 77840, U.S.A. TEL: (409)764-0438



INDUSTRIAL CORPORATION 10F-3, 151, SEC. 4, HSIN YI RD., TAIPEI 10657, TAIWAN, R.O.C. TEL: (02)7034461 TELEX: 25118 SYNCOMP

FAX: 886-2-7075043

## 100% IBM PC/XT/AT Compatibles

#### M-3355 **PC/AT Computer** (assembled 8MHZ)

- 1. CPU: 80286 w/80287 socket
- 2. RAM: 640K on board
- 3. ROM: 16K BIOS
- 4. ONE 1.2 MB Floppy Disk Driver
- 5. Detached Intelligent Keyboard
- 6. FDD/HDD Disk Controller
- 7. Monochrome Graphic w/printer Card
- 8. Serial/Parallel Card
- 9. Eight Expansion Slot
- 10. Power: 200W



#### M-3322 PC/XT Trubo Computer (Two Speed)

- 1. CPU: 8088-2, 8/4.77 MHZ
- 2. RAM: 640K on board
- 3. ROM: 8K BIOS
- 4. Two Double Side Disk Drive
- 5. Detached Intelligent Keyboard
- 6. Disk Drive Interface
- 7. RGB Cofor card w/Composite
- 8. I/O: RS-232, Clock Calender, Parallel Printer port, Game Port
- 9. Eight Expansion Slot
- 10. Power: 150W, 110/220 VAC

ENTERPRISES CO., LTD.

P.O Box 32-30 Taipei, Taiwan, R.O.C.

Tel:(02)771-4809

Telex: 23125 MICROWAY

Fax: 886-2-7814212

F	•		•	-	•		•		•	)	•	)	•	•	F		•		•	45	stol	and	Con	•			the	2 G		der	rec	• F		00	•	•	•	_	)	•		•	•	•	•		-
		" STATE BECOME A SAGE						:	: 0				; KOUTINE TO CATER FOR	LOWER CASE LEITERS			;COMMAND CHECK				SAVE Y OFFSET				; IS IT AN ADDRESS	; IS IT LOWER CASE				;CATER FOR ABBREVIATIONS				;BOTTOM OF COMMAND LIST	ites; so eath	; ELSE LOAD ADDRESS	; AND GOTO COMMAND CODE				THE COMMAND PERFORMED THEN	STOP OTHER ROMS RESPONDING		SET UP HOME COMMAND	ō ở	;SET UP POP COMMAND	
		EQUIS "DEMOROM - 1	& ØD		800	EQUS POP			EQUS "DEMOROM 1.0"	ROUS " DEMOROM"	ROL	3 800	LDA COMLIST,X	*820		BEQ CLOOP	Duckor	TXA	TYA		STY &@A@2 LDX #&FF	LDY &@A@2	INY	COMLIST,X	BMI NEG	LOCHK	JMP CLOOP	LDA COMLIST,X BPL BACKUP		LDA (8FZ),Y	BNE GRABY		LDA COMLIST,X BNE GRABADD	# 保护 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	&@A@1	LDA COMLIST+1,X	EXEC	PLA PLA	TAY	TAX	PLA Brs HOP	LDA #400	RTS JMP (&@A@@)	S "HOME"	HOME MOD 25	EQUS "POP" EQUS POP DIV 256	
	- Nata	· DIEAL						.LTEXT				A 600	. LOCHK				. COMCH					.GRABY	CLOOP				. BACKUP							. NEG	.GRABADD			.BYE					.EXEC	. COMLIST			
	770	98/	800	810	820	848	850	860	870	890	906	910	976	946	920	960	986	990	1010	1020	1030	1050	1070	1090	1100	1120	1130	1150	1170	1180	1200	1220	123 <b>0</b> 124 <b>0</b>	1250	1256	1280	1300	1310	1330	1340	1360	1380	1390	1410	1430	1440	

•							,		•
	1500	POP.	LDA	#8.07	CODE FOR POP	FOR	POP		
•	1510		JMP	&FFE3					_
,	1520		-						•
	1530	NEXT PASS							
•	1540	OSCLI "*SA	VE "+	OSCLI "*SAVE "+FL\$+" 4000+"+S1R\$~(02-84000)	+S1R\$	-201	24000)		•
	1550	PRINT' FL\$	. Sa	ved. Code le	ngth=&	3), 10	PRINT' FL\$:" saved. Code length=&";`(0%-&4000);" bvtes."'	3S. 111.	_
•	1560	PRINT "*LC	AD ";	PRINT "*LOAD ";FL\$;" 8000 will load it into"	ill lo	i pe	t into"		
_	1570	PRINT "sid	eways	PRINT "sideways RAM to behave as a ROM."	ve as	RO			•
_									_



# **Amstrad CPC Crimebusters**

by E Covell

This is a whodunnit game for two to six players. You have to solve a murder at Strangeways Hall which occurred in conjunction with an armed robbery. Each player has to identify the murderer, his/her accomplice, the stolen object, the murder weapon, and the room in which the crime was committed.

The building has two floors, each with several rooms. Some of the doors are locked and others not. At the start of the game, the keys can be located in the pantry or the linen room.

lt's the cook who has been murdered, and the cause of death will be revealed when you find the body. The game is a competitive one — the other crimebusters can unlock and lock doors on you, and also steal a

When you have all the answers to the murder, you must go to the room where the murderer is and accuse him/her. If you answer all the questions correctly, you'll win; if you fail to, you'll be eliminated from the game.

Players take turns and have to give a simple code to identify themselves in order to eliminate cheating. As the game is essentially one of logic, it's a good idea to use pen and paper to record discovered facts.

Note that the author's printer was configured to produce the '£' sign instead of the '#' sign (the Amstrad being a British machine).

## **BONDWELL PC**

FOR THE EXECUTIVE ON THE MOVE!



950

(Incl. Tax)

**Bondwell BW18** 

Transportable MS DOS 2.11 computer, weighs 13.2 kg, 640K, 9" screen, two 360K drives.

COMPUTER EXPO 86

BRISBANE

**Bondwell PC-AT Benchtop** 

80286 based (6 - 8MHZ switchable), MS DOS 3.2, 512K, 20Mb hard disk, Hercules colour card standard.

(Incl. Tax)

NOVEMBER Bondwell PC-XT

8088 based (4.77MHZ), one floppy, 20Mb hard disk, 640K, MS DOS 2.11, colour graphics adaptor, serial, parallel, joy stick, real time clock.

\$2500 (Incl. Tax)

(Incl. Tax)

Bondwell

Lap Portable MS DOS 2.11

batteries.

computer, weighs 4.5 kg, completely

self contained with 512 RAM, 720K

disk drive, backlit LCD screen and

## MICRO EDP & HARDWA

9A/1 Leura Avenue, Claremont, W.A. P.O. Box 91, Claremont, W.A. 6010

Phone (09) 384 5511

Telex: AA 96140

95 p=FNr(6):m%=p 180 IF p>4 THEM FP="wcman's":fq\$="man's":GOTO 110	505 8k%(p)=p 510 x==x 515 x=x=x 515 x=x=x
115 p=FNr(4):1F =2<5 THEN =2=p+4 ELSE =2=p	Siprimaries
125 p=FNr(8):IF dZ(p)=1 THEN 125 130 dZ(p)=1	530 FOR x=1 TO 3 535 LOCATE £3,1,z:PRINT £3,x;w\$(x)
NEXT	CAT I TO THE WAY TO THE T
140 p=FNr(14):IF p=6 OR p=11 OR p=1 THEN 140 145 b2=p	
	555 NEXT 555 555 555 555 555 555 555 555 555 5
MALLE KNYTHEFRY (14):IF PEO ON PELL MARN IF Check(p) <>0 THEN 155	
	5 76 WEXT 575 GOTO 650
x=1: WHILE x<8	
180 p=FNr(14):IF p=6 OR p=11 OR p=1 THEN 180	
195 x=x+1 200 HEND	; nqr 600 IF nqr<0 OR nqr>5 THEN 595
x=1:WHILE x<9	665 FOR z=1 TO npg.
216 $p=Fnr(14):1F$ $p=b$ OK $p=1$ UM $p=1$ THEN 225 215 $8f(x)=p$	
	615 ph\$(x) 1-14 (x)
2.230, x=1:WHILE x<7	625 GOSUB 1765;CLS£2:PRINT£2,pn\$(x):INPUT £2,"Without letting the other players
P=FNr(12)	see type a 2 lettercode for identification, please, 'codes(x)
245 WEND	GOS NEXT GOS
250 FOR x=1 TO 12	
255 IF KE(K)=0 IMEN KE(K)=II	659 F=0:0=== 100P 659 F=0:0==FNr(no2)
	0=3 XTIHM SS9
270 K%(13)=p 275 BOB == TO conficial virial wayer	660 pn=pn+1:1F pn:npT THEN pn=1
	GOS GOOD 1765;CL882:PRINE2.pn\$(pn):INPUTE2. "Please type in your code letters"
HWZ=FNr(3	;cl\$:IF cl\$: <pre>cl\$:\cl\$:\cl\$:\cl\$:\cl\$:\cl\$:\cl\$:\cl\$:\</pre>
H	CAS PRINTEL: "LOOKING FOR THE FLOOR PLAN"  6.60 IF PF% (Pn) = 0 THEN GOOBU 1700 ELSE GOSUB 1865
	699 FOR x=1 TO 7:LOCATRE6.1.x+*PRIVIÉ6.places#(pn.x.r) NEXT 695 FOR x=1 TO 7:LOCATRE6.1.x+*.PRIVIÉ6.places#(pn.x-3):NEXT
p=FNr(	
320 IF KHI NHEN PS(P)=IPS 325 IF KHI THEN PS(P)=EqS	/d5 pv4(pn) = pv4(pn) + LkFT4(r4(yy), 1) 7.00 CLSC7: PRINTC7, pv4(pn)
) %d3	
335 x=x+1:WEND 340 POR x=1 TO 14:FOR v=1 TO 4:READ dr\$(x:v):NEXT:NEXT	720 C182::RWIE2, "You are standing in the ";r\$(yy) :GOSUB 1750:GOSUB 970 725 GOSUB 1750"
FOR	
350 FOR x=1 TO 3:READ w\$(x):NEXT	735 PRINTEZ,"1)QUESTION SUBFECT 2.98EACH 3.1ACCUSE" 740 PRINTEZ,"4,NADTHING 5.1PTCK 110 5.1PTCK 110
FOR	
365 FOR x=1 TO 14:READ r\$(x):NEXT 378 FOR x=1 TO 14:rX(x)=x:NEXT	750 IF opt. (1 OR opt. 55 FIREN PRINTE2, "Try again"; GOTO 730 755 ON opt. GOSUB 1280, 1320, 1470, 1340, 1410
POR $x=1$ TO 14:check( $x$ )=0:NEXT	
388 BN(8%)=b%:sw(a%)=b%:IF 8%<5 THEN qq=0 ELSE qq=4 385 x=1:WHILE x<4	765 IF PF (PA)=1 IMEN 825 770 IF E=1 THEN 825
y=FNr(4)+qq:IF sw(y)<>0 THEN 390	
395 z=FNr(14):IF z=11 OR z~6 OR z=5% IMEN 395	GOSUB 1885. 780 CLSE2: GG-0:PRINTE2."You are standing in the ":r\$(vv)
check(z):1:SW(y).z	
410 MEND 415 IF mX<5 THEN pp=4 ELSE pp=0	//PG TUN T. L. 4. "Q" THEN PRINT £2.dr\$(yy.x.);" ;
ō.	
425 % L:WHILE K<4 430 y=FN:(4)+pp:IF sw(y)<>0 THEN 430	Good Coden Tyos: LOCATEZ, 1.2 INPUTZ, "Weve to another room (y/n)"; ans\$ 610 IF ans\$ "v" AND ana\$</p
	815 IF ans\$""y" THEN GOSUB 895:IF Ed=1 THEN 780 ELSE yy=p11(pn):CLSE2:PRINTE2."Y
440 IF CHECK(SW(P))=1 INEM 433 445 Check(Sw(P))=1:Sw(y)=Sw(P):Sk(P)=y:Sk(y)=p:x:x+1	ou are moving to the "!reforgur 1750  B20 CLSE::CLSEE:CLSEF:(ax=0:qc=0: GOSHB 2295
	025 WEND
400 SK(#6, 44.3K(44)-#4	B30 CLS:LUCATE 12,3:PKINT pn#(pn);" YOU HAVE WON 1" A34 GASHR 2305
470 p=FNr(4):q-FNr(4):1F p q THEN 470 475 TF set(n) 00 08 sk2(a) 00 THEN 470	645 PRINT 'TO HELP THE OTHER CRIME BUSTERS THIS IS"
	666 PRINTITHE accomplice was the "sg all all all all all all all all all al
490 E.E. SHILLE KUS	
	870 FRINT"The stolen article was the ";v\$(saI)





The Professional Monitor Company



#### DIGIS-80286 SPEEDCARD

- Makes your XT perform like an AT
- Runs at 8MHz, Toggle between AT & XT speeds
- Optional 80287 co-processor
- Fits directly into XT slot
- Increase XT processing speed up to 9 times



#### **DIGIS-1000 EGA CARD**

- Provides multiple display modes: Enhanced Graphic Adaptor Colour Graphic Adaptor Mono/Graphic Display Adaptor 256K Dynamic Ram Screen Buffer
- 16 Colours in 640x200 to 720x350 in Monochrome
   Supports 64 colours in 640x350 under EGA mode

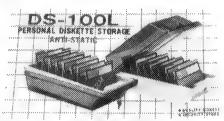
Printer port built-in selectable LPT1, LPT2, LPT3



IBM Enhanced Graphics Adaptor.
Dual mode 15.75 to 21.85 KHz, 640 x 200 to 720 x 350 pixels resolution. Green/amber/16 to 64 colors.

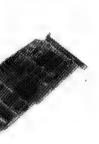
#### MD-3 MULTI-DISPLAY HI-RESOLUTION RGB MONITOR

- Compatible with IBM, APPLE and most other PC systems
- Includes green/amber/full color Multi-Display function



**DISK STORAGE BOX** 

Holds 100 51/4" Floppy Disks Flip-up/removable lid with lock



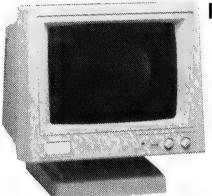
#### DIGIS-1088 HD/FD Controller

- Control up to 2 Floppy & 2 Hard disks
- For 360K & 1.2M Floppy or both
- 10M/20M/40M Hard disks - Compatible with PC/AT



#### **DATAS TTL MONITOR CH-1216**

- Non-glare high contrast
- Suitable for IBM & compatible
- Ideal for Word Processing or Graphics



- Amber Screen with Micro-mesh
- Swivel Base for Pan & Tilt
- 22MHz Bandwidth





Features

- Convenient stowage facilities
- · Cantilever drawer with ball bearing slides

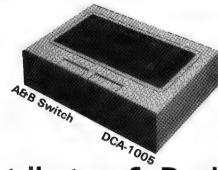
: 555 x 395 x 90mm Dimension

Weight

#### We use PC board construction



**Push Button** 



#### GENERAL SPECIFICATIONS:

Construction: Plastic case (Ash color), Dimensions: 185 x 129 x 50mm,

Weight: 400gr,

Contact Ratings: 100V rms 2 Amp

(Switching current 500 mA),

Contact Resistance: 100 milliohms

Isolation Resistance: 1.5 x 104 megaohms. Dielectric Strength: 1,000VAC between contacts,

Cross Talk: 10 MHZ 51 dB 500KHZ 78dB.

Distributors & Dealers Wanted

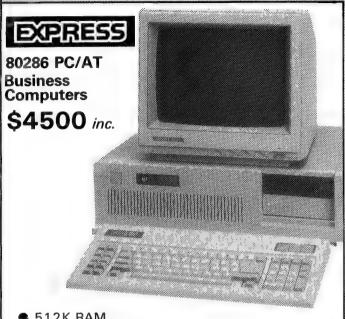
## DIGITAL RESOURCES PTY LIMITED

169 Phillip St., Waterloo, N.S.W. 2017, Australia.

Phone: (02) 690 1268 — 690 1540 Fax: (02) 699 9636 Telex: AA75406

• • • • • • • • • • • • • • • • 1445 IF pcf(pf)=13 THEN PRINTE2."You have filthed the SKELFTON key":GOTO 1450
1450 F pcf(pn)=9 THEN PASS
1450 F pcf(pn)13 THEN PRINTE2."You have dropped the ";r%(pcf(pn));" key":kf(pc sho IF PIK(Pf) or Kyy) THEN PRINIEZ, pn&(pf);" is not here": GOSUB 1750: RETURN IF pck(pf)=0 THEN PRINIEZ, pn&(pf);" is not carrying anything": GOSUB 1750: RE 1515 GOSUB 1765: PRINT£2, "You say the murderer is the ";s\$(mg):INPUT£2,"(y/n)";a 1525 IF ans%="n" THEN 1505 1530 IF s%(mg) <>P1%(pn) THEN PRINI £2,"You must be in the same room as the suspe GOSUB 1765:INPUTE2,"Which key do you want to pick up(1 13)";kp [F k½(kp]<>r%(yy) THEN PRINTE2,"The ";r%(kp);" key is not in this room";50S 1550 GOSUB 1765: PRINT£2, "You say the accomplice is the ";s\$(ag):INPUT£2."(y/n)" Ç 1930 CLSk2:kk=0: FOR x:1 TO 3:IF w\(\frac{1}{2}\)(pn) THEN PRINTE2,"You find the ";w\(\frac{6}{2}\)(xk=1:PRINTE2,"On it are a ";p\(\frac{6}{2}\)(x);" fingerprints":place\(\frac{6}{2}\)(pn.x)=LEFT\(\frac{6}{2}\)(yy).1) 8 ķ 9S!):GOTO 1305 1280 [F SK%(qs)-wt AND qs=m% THEN PRINTE2,"The ";s\$(wt);" was in the ";r\$(b%):GO 1275 IF skiqs)=wt AND qs:=% THEN PRINTE2,"The ";s\$(wt);" was in the ";r\$(swisk%) sk(qs)-wt AND qs=al THEN PRINTE2, "The ";s\$(wt);" was in the ";r\$(sw(skl) 1290 IF sk%(qs)=wt AND qs-a% THEN PRINTEZ,"The ";s%(wt);" was in the ";r%(b%):GO IF pc%(pf)<13 THEN PRINTE2, "You have filched the ";r%(pc%(pf));" key":GOTO do you want to put to the ";s\$(qs);" (a 1535 IF mg<>ml THEN wa=1 1540 GOSUB 1765; CLS£2:INPUT£2,"Type in the number of the ACCOMPLICE (1-8)"; ag u wish to know (1.8)";wf 1265 JF wt-ags THEN PRINTEZ,"I'm not telling you i" :GOTO 1305 1270 CLSEZ:IF skigstywt ALMD sz&lgs):vwt THEN PRINTEZ,"The "; s\$igs)" doesn't 1260 CLS£2:GOSUB 1755:INPUTE2,"Whose whereabouts at the time of the murder do Wish 1425 GOSUB 1765:INPUTE2, "From which player do you want to filch 7Type number wn before their name";pf pc2(pn)=13 THEN PRINTE2"You have dropped the SKELETON KEY": k2(13)=yy 1505 GOSUB 1765;CLS£2:INPUT£2,"Type in the number of the MURDERER (1-8)";mg IF fk=0 THEN FRINT£2, "There are no keys to pick up":GOSUB 1/50:RMTURN 1365 IF Kp-13 THEN PRINTE2,"You have picked up the SKELETON key":GOTO 1377, 1370 PRINTE2,"You have picked up the "praikp):" key" dk=pc%(pn):IF dk=0 THEN 1395
IF dk<13 THEN PRINTE2."You have dropped the ";r%(dk):" key":GOTO 1390
IF dk=13 THEN PRINTE2."You have dropped the SKELETON key"</pre> you w 1295 IF SK(qs)=wt THEN PRINTE2,"The ";s\$(wt);" was in the ";r\$(sw(wt)) 1300 IF sk%(qs)=wt THEN PRINTE2,"The ";s\$(wt);" was in the ";r\$(sw(wt)) fp=0 THEN PRINTE2, "There are no players here":GOSUB 1750:RETURN 1255 GOSUB 1765:IF wq\$="a" THEN CLS£2: INPUT£2,"Whose whereabouts do know (1-8)";wh: PRINT£2,"The ";s\$(wh);" is in the ":r\$(s\$(wh)):GOTO fp=0:CLS£2:FOR x=1 TO np%:IF pl%(x)=yy AND x<>pn THEN fp=1 pcf(pn)=pcf(pf):pcf(pf)=0:GOSUB 1750:RETURN CLSE2:PRINTE2,"YOU MUST GIVE THE FOLLOWING INFORMATION" 1480 PRINTEZ, "STOLEN OBJECT, LOCATIONS OF BODY & WEAPON"; CLS£2:fk=0:FOR x 1 TO 13:1F k2(x).r2(yy) THEN fk=1 MURDERER, ACCOMPLICE, WEAPON," 1485 GOSUB 1765:INPUT£2,"Are you prepared (y/n)";yp\$ 1490 IF yp\$<>"y" AND yp\$<>"n" THEN 1485 1495 IF yp\$="n" THEN fq=1:RETUEN IF kk=0 THEN PRINTE2, "You find nothing" IF ans\$<\"y"AND ans\$<\"n" THEN 1550
IF ans\$="n" THEN 1540
IF ag<\all THEN Wa=1 IF ans\$<>"y"AND ans\$<>"n" THEN 1515 GOSUB 1765:PRINT£2,"Which question ct you accuse":fq=1:GOSUB 175@:RETURN IF mg<1 OR mg>8 THEN 1505 ag<1 OR ag>8 THEN 1540 +CHR\$(32)+LEFT\$(p\$(x),1) 1325 NEX1 1470 CLSEZ:PRINTEZ:"YOU MI 1475 PRINTEZ:"CORRECTLY: qa=qa+1 :GOSUB 1750 GOSUB 1750: RETURN GOSUB 1750: RETURN bc2(bu)=kb 1305 UB 1/50:RETURN k\$ (dk)=yy k%(kp)=0 RETURN K( bu) )= xx 1460 IF TO 1305 ro 1305 1555 1520 1340 ( 1345 7 1350 1360 1400 1355 1375 1380 1430 368 1435 1085 PRINT £1 1090 IF b%=r%(yy)THEN PRINT£1,CHR\$(32);"The cook's body.":PRINT£1," She has been dZ(d)=1 THEN CLSE2:IF pcZ(pn)<a href="eq:align:color:black">cls.pcZ(pn)<b align:color:black</a> and you haven't a key":fed::GOSUB 1.569 RETURN<br/> pcZ(pn)=13 THEN PRINT E2, "The door is locked but the skeleton key will o IF pcg(pn)=a OR pcg(pn)=b THEN PRINTE2,"You have the ";r\*(pc2(pn));" koy";G IF vv=@ THEN PRINT£2, "There are no suspects in this room":fq=1:GUSUB 1/50:R WHILE garnqr:GOSUB 1765:CLS£2: INPUT£2,"Which suspect do you wish to questi GOSUB 1765:INPUT£2, "Type initial letter of the direction youwish to move";di FOR x=1 TO 7:IF  $v_{\lambda}^{z}(x)=0$  THEN 1015 IF  $v_{\lambda}^{z}(x)=r_{\lambda}^{z}(yy)$  THEN PRINTE1,CHR\$(32);v\$(x):fl=1:place\$(pn,x+3)=LEFT\$(r\$(yy)) IF sg(x)=rg(yy) THEN PRINT£1,CHR\$(32);s\$(x):fl=1:place\$(pn,x+10)=LEFT\$(r\$(y qs=9 THEN qa=nqr:GOTO 1315 s%(qs)<>p1%(pn) THEN PRINT£2,"The ":s\$(qs);" is not in this room":GOSUB pen it":df(d)=@:GOSUB 175@:GOTO 1195 1165 FRINTE2."the door is locked but you have the ";r\$(pcf(pn));" kcy" 1176 GISUB 1765;"INPUTE2."Do you want to lock the door behind you (v/n)":ld\$ 1175 IF ld\$<\"y" AND ld\$<\""" THEN 1170 1180 IF \d\$-"y" THEN df(d):1:GOTO 1195 IF pcf(pn)=0 THEN PRINTE2,"You are carrying nothing":GOTO 995
If pcf(pn)=13 THEN PRINTE2,"You are carrying the skeleton key":GOTO 995
PRINTE2,"You are carrying the ";r\$(pcf(pn));" key" (1-8).Type 9 if no further questions";qs:IF qs<1 OR qs>9 THEN 1215 IF dirs="u"aND drs(plX(pn),1)="up" THEN xx=1:pfX(pn)=1:GOTO 950 IF dirs="u"aND drs(plX(pn),1)="DOM" THEN xx=1:pfX(pn)=0:GOTO 950 GLSSZ:PRINTEZ:""YOU can't move that way":FOR x=1 TO 1590:NAXT PRINT"The "w\*(mw\overline");" was in the ";r\*(mw\overline\overline) PRINT:PRINT"Hope you enjoyed playing CRIME BUSTERS !" IF K%(13)=r%(yy)THEN PRINTE1,"13 SKELETON key":f1=1 IF kZ(x)=rZ(yy) THEN PRINT£1.x;r\$(x);" key":fl=1 MURDER WHERE WAS" dr\$(p1%(pn),1)="N" THEN xx=1:GOTO
dr\$(p1%(pn),2)="S" THEN xx=2:GOTO
dr\$(p1%(pn),3)="E" THEN xx=3:GOTO
dr\$(p1%(pn),4)="W" THEN xx=4:GOTO IF plX(x)=rX(yy) THEN PRINTE1,x;pn\$(x):f1-1 ";md\$:fl=1:bf%(pn)=1 1095 IF fl=0 THEN PRINT£1,"NOTHING OF INTEREST" PRINT £2, "You are standing in the ";r\$(yy) IF nr%(yy,xx)>100 THEN GOSUB 1105:GOTO 960 ...(1-8)" FOR x=1 TO 8: IF S%(x)-pl%(pn) THEN vv-1 CLS£2:PRINT£2,"a) WHERE IS THE. PRINT£2,"b) AT THE TIME OF THE PRINT£2,"THE....(1-8) b=nr%(yy,xx)-100:a=yy d2(d)=0 THEN 1190 a\*b=110 THEN d=6 IF a\*b=12 THEN d=2 IF a\*b=28 THEN d=3 a\*b=42 THEN d=4 a\*b=10 THEN d=5 a\*b=96 THEN d=7 a\*b=72 THEN d=8 =0: FOR x=1 TO 8 d%(d)-0:GOTO 1195 IF x=pn THEN 1080 dir\$="e"AND dr\$
dir\$="e"AND dr\$ IF a\*b=3 THEN d=1 FOR x=1 TO npZ dir\$="n"AND FOR x=1 TO 12 b=nr%(yy,xx) p1%(pn)=b 1226 IF qs=9 THB 1225 IF sK(qs) <> 1756:GOTO 1215 1236 CLS£2:PRINT 1235 PRINT£2."D) 1240 PRINT£2."TF CLSE1:CLSE2 1195 RETURN 1200 FOR x=1 1205 NEXT PRINTE1 PRINTEL RETURN NEXT OT0 1170 1160 IF IF 1120 1125 1130 1140 1145 1150 1185 1130 1210 1215 1025 1030 1035 1000 1010 0201 1100 1115 1015 1020 1040 1045 1050 1055 1060 1065 1075 888 885 898 895 946 945 958 958 966 965 976 978 978 978 998 905 915 920 925 930 935 G •

#### **BUY DIRECT FROM IMPORTER AND SAVE \$\$\$ + 1 YEAR WARRANTY** DEAL WITH COMPUTER PROFESSIONALS AND GET BEST TECHNICAL SUPPORT



- 512K RAM
- Hard disc/Floppy controller

(Monitor Extra)

- 1.2Mb Floppy disc
- SEAGATE 20Mb Hard disc
- 200W Power supply
- Monochrome graphic card w/parallel printer port
- Battery backed clock calendar

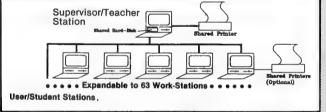


- **640K RAM**
- 2 x 360K Floppy disc drives
- 150W Power supply
- Color graphic card w/3 outputs
- Multi I/O card
- Parallel printer port
- Serial port
- Game I/O Port
- Real time clock and calendar with battery back-up.
- 20Mb system from \$2299 inc.
- Dual speed option plus \$90
- AT case and keyboard option plus \$99

#### PLEASE CALL FOR BEST PRICES ON OTHER CONFIGURATIONS — YOU'LL SAVE \$\$\$

TEN-NET, a true file serves, allows you to interconnect all your IBM PC/XT/AT or compatible with a half-size interface card and a set of network software. With the professional support from ECS. TEN-NET will be the best solution for OFFICE AUTOMATION or ELECTRONIC CLASSROOM.

- CSMA/NC (Double CSMA with priority, results no collision) • Date rate: 1 Mbps
- Total network length: 4000ft
- Fully network transparent
- File Locking Support
- Password Security
- Printer Spool Support
- Electronic Mail
- Station Monitor Support
- Directly Message Transfer Support
- Full Screen Transfer Support
- Public File Protection Attribute Support



\$110

\$90

\$75

\$45

#### Service

Fixed Price Service for IBM PC and Compatibles

Mother Board (AT) Mother Board (XT)

Hard Disk Controller Floppy Disk Controller Other add-on card

\$70 APPLE II and Compatible \$70

All parts included

**Printers and Monitors** please call

For more details or demonstration please contact ECS

WE HAVE HEAPS OF POPULAR SOFTWARE PACKAGES BUT WE ALSO WRITE SOFTWARE FOR ALL TYPES OF BUSINESS. NO JOB TOO SMALL!!

## DEALERS ENQUIRIES WELCOME EFFICIENT COMPUTER SERVICES PTY. LTD.

4th Floor, Hong Kong Bank Building, 724-728 George Street. Tel: (02) 281 1255, 281 1256. Fax: (02) 211 3058

• • • • • • • • • • • • • • • • • 1925 PRINTEL CHR\$(149); SPACE\$(8); CHR\$(151); CHR\$(154); CHR\$(153); "E ": CHR\$(151); ST RING\$(3):144; PETRING\$(4):145; CHR\$(157); T300 PRINTEL; CHR\$(149); SPACE\$(6); CHR\$(149); SPACE\$(4); CHR\$(149); "LINEN "; CHR\$(14 PRINTEL, CHR\$(149);" BEDROOM"; CHR\$(151); CHR\$(154); CHR\$(156);"S "; CHR\$(149); S 1915 PRINT£1,CHR\$(149);SPACE\$(8);CHR\$(151);CHR\$(154);CHR\$(157);"A ";CHR\$(149);SP PRINTE1, CHR\$(149); SPACE\$(8); CHR\$(151); CHR\$(154); CHR\$(157); "G"; CHR\$(149); SP ;CHR\$(157);"ROOM";SPACE\$(3);CHR\$(149); 1940 PRINT£1,CHR\$(151);STRING\$(3,154);CHR\$(241);STRING\$(4,154);CHR\$(155);CHR\$(15 1945 PRINT£1.CHR\$(149);SPACE\$(10);CHR\$(149);SPACE\$(2);CHR\$(147);STRING\$(7,154);C 2025 hms-CHR\$(211)+CHR\$(209)+1d\$:1ms-CHR\$(244)+CHR\$(245)+1d\$+hms+hms+CHR\$(211)+C 1es=CHR\$(242)+CHR\$(208)+1d\$+CHR\$(243)+CHR\$(210)+1d\$+CHR\$(211)+hd\$+CHR\$(243) 2035 1b\$=CHR\$(242)+CHR\$(205)+1d\$+CHR\$(243)+CHR\$(204)+1d\$+CHR\$(211)+CHR\$(2205)+1d\$ 1s\$=CHR\$(204)+CHR\$(205)+1d\$+CHR\$(205)+CHR\$(10)+CHR\$(205)+1d\$+CHR\$(205)+CHR\$ 2050 11\$-CHR\$(208)+CHR\$(242)+hd\$+CHR\$(211)+hd\$+CHR\$(211)+hd\$+CHR\$(211)+hd\$+CHR\$(205) CHR\$(248)+CHR\$(240)+CHR\$(246)+C 2060 gun\$=gun\$+CHR\$(243)+STRING\$(2,210)+CHR\$(249)+SPACE\$(4)+CHR\$(149)+CHR\$(10)+S 2065 gun\$=gun\$+CHR\$(147)+CHR\$(250)+CHR\$(154)+CHR\$(254)+CHR\$(32)+CHR\$(253)+CHR\$(2 55)+CHR\$(10)+STRING\$(6,8)+CHR\$(193)+CHR\$(154)+CHR\$(211)+SPACE\$(2)+CHR\$(205)+CHR\$ 2070 gun\$=gun\$+CHR\$(205)+CHR\$(255)+CHR\$(32)+CHR\$(309)+CHR\$(10)+STRING\$(3.8)+CHR\$ ST ";CHR\$(149); 1935 PRINT£1,CHR\$(149);SPACE\$(8);CHR\$(149);CHR\$(32);CHR\$(150);CHR\$(154);CHR\$(32) ";CHR\$(14 Irs=CHR\$(242)+CHR\$(205)+CHR\$(10)+STRING\$(2,8)+CHR\$(243)+CHR\$(204)+CHR\$(10)+ : PAPERE3, 1910 PRINTEL, CHR\$(149); SPACE\$(8); CHR\$(151); CHR\$(154); CHR\$(157); "S "; CHR\$(149);" 1c\$-CHR\$(204)+CHR\$(205)+1d\$+CHR\$(211)+hd\$+CHR\$(211)+hd\$+CHR\$(21) TO 1500:NEXT 12 3,0,26:CLS STRING\$(2,8)+CHR\$(211)+CHR\$(205)+CHR\$(10)+STRING\$(2,8)+CHR\$(211)+CHR\$(209)+uph 2120 PRINTE3, USING"&";1b\$;" ";1u\$;" ";1s\$;" ";1t\$;" ";1e\$;" ";1r\$;" ";1s\$;FOR g, 2105 CLS£1:WINDOM£1,31,40,14,20:PRINT£1,gun\$
2110 LOCATE 30,15:PRINT CHR\$(238):GOSUB 2250:FOR x=1 TO 250:NEXT:FOR x=29 TO PRINTE1,CHR\$(149);SPACE\$(10);CHR\$(149);SPACE\$(10);CHR\$(149); PRINTE1,CHR\$(147);STRING\$(10,154);CHR\$(155);STRING\$(10,154);CHR\$(153); x=29 TO STEP-1:LOCATE x,15:PRINT bul\$;:FOR y=1 TO 5:NEXT:NEXT
2115 WINDOWE3,1,24,13,16 :PENE3,1:PAPER £3,3:CLS£3:FOR x=1 TO 700:NEXT 1955 PRINTEL, CHR\$(149); SPACE\$(3); "ROOM"; SPACE\$(3); CHR\$(240);" NURSERY REM:title screen BORDER @:PAPER @:INK @,@:PEM 1:INK 1,26:PEM 2:INK 2,6:PEW 3:INK ";CHR\$(149);" GUEST 2090 LOCATE 30,7:PRINT CHR\$(238):GOSUB 2250:FOR x=1 TO 250:NEXT:FOR DRESSING ":CHR\$(149);SPACE\$(10);CHR\$(149); PRINTE1, CHR\$(149); SPACE\$(10); CHR\$(149); SPACE\$(10); CHR\$(149); RP-1:LOCATE x,7:PRINT bul\$;:POR y=1 TO 5:NEXT:NEXT
2005 PAPER 22,3:1282:POR x=1 TO 700:NEXT PAPERE2.0:CLSE2
2006 PRINTES. USING'R':1.05; "i.1f\*;" "i.15;" "i.15;" "i.16\$;" POR 2080 WINDOWEL, 31, 40, 6, 12: PAPER £1, 0: CLS£1: PEN£1, 2: PRINT£1, gun\$ 2139 124="PROCEDE AT ONCE TO STRANGEMAYS HALL STOP"
2146 144="INVESTIGATE REPORT OF ARRED ROBERTY STOP"
2146 145="BELLEVED COOK HAS BEEN WINDERED STOP IT"
2145 154="BELLEVED COOK HAS BEEN WINDERED STOP IT"
2156 164="JOB STOP WORDOY HAS LEFT THE HOUSE SO"
2155 174="THE ASSIGNMENT SHOULD NOT PROVE TOO"
2160 164="DIFFICILE STOP AN ARREST SHOULD BE MADE "
2165 194="WHITHIN THE HOUR STOP GOOD LUCK STOP"
2170 1104="WESSAGE ENDS"
2175 GOSUB 2260
2175 GOSUB 2260
2170 1104="WESSAGE ENDS" 2020 hi\$=CHR\$(211)+hd\$:li\$ hi\$+hi\$+hi\$+CHR\$(211)+up\$ PRINT£1, CHR\$(149); SPACE\$(8); CHR\$(149);" 2040 lu\$=hm\$+hm\$+hm\$+CllR\$(205)+CHR\$(204)+up\$ 1d\$-CHR\$(2)+CHR\$(10)+CHR\$(8)+CHR\$(8) STOP" 4); CHR\$(157); SPACE\$(10); CHR\$(149); =1 TO 1500:NEXT 2125 11\$="TO ALL CRIME BUSTERS WINDOW£2,1,18,6,9:PEN£2,1 2075 bul \$=CHR\$(231)+CHR\$(32) hd\$=CHR\$(10)+CHR\$(8) [251]+CHR\$(210)+CHR\$(252) PRINT£1, CHR\$(149);" +CHR\$ (243)+CHR\$ (204)+up\$ 2000 up\$=STRING\$(3,11) ACE\$(7); CHR\$(149); (10)+STRING\$(4,8) ACE\$(7);CHR\$(149) 10) +STRING\$ (9,8) +CHR\$(210)+up\$ RETURN (RINGS(6,8) O :CLSE3 1950 1960 1920 1980 1985 1990 1965 1995 2015 1885 CLSE1:LOCATEE1.1.1:INK 3.20 1890 PRINTE1.CHR\$(156);STRING\$(8.154);CHR\$(156);STRING\$(4.154);CHR\$(159);STRING\$ (7.154);CHR\$(156); 1895 PRINTE1.CHR\$(149);SPACE\$(9);" P ";SPACE\$(8);CHR\$(149); --- A COSIPRINTEZ, "You say the object is the ";v\$(og):INPUTEZ,"(y/n)";ans\$ ans\$ IF gbc1 OR gb>14 THEN 1635 GOSUB 1765:PRINTE2,"You say the body was in the ";r\$(gb):INPUTE2,"(y/n)";an :015 PRINTE1, CHR\$(149);SPACE\$(8);CHR\$(151);CHR\$(154);CHR\$(157);SPACE\$(2);CHR\$(14 9);"SITIING";CHR\$(149); 1820 PRINTEL, CHR\$(149); SPACE\$(8); CHR\$(151); CHR\$(154); CHR\$(157); SPACE\$(2); CHR\$(14 3);" ROOM ";CHR\$(149);
1825 PRINTE1,CHR\$(149);"KITCHEN ";CHR\$(151);CHR\$(154);CHR\$(153);SPACE\$(2);CHR\$(1 1835 PRINTEL,CHR\$(151);STRIMG\$(3,154);CHR\$(241);STRING\$(3,154);;CHR\$(158);CHR\$(1 531;SANCE\$(4,6);SPACE\$(149);SPACE\$(7);CHR\$(149);"HALL";CHR\$(151);STRING\$(3,154);CHR\$(186) 1840 PRINTEL,CHR\$(149);SPACE\$(7);CHR\$(149);"HALL";CHR\$(151);STRING\$(3,154);CHR\$ IF wg.1 OR wg.3 THEN 1570 GOSUB 1765: PRINTE2,"You may the weapon is the ";w\$(wg):INPUTE2,"(y/n)";ans PRINTE1, CHR\$(149):SPACE\$(8):CHR\$(151);CHR\$(154);CHR\$(158);CHR\$(154);CHR\$(15 1805 FRINT£1,CHR\$(151);STRING\$(7,154);CHR\$(32);CHR\$(159);CHR\$(154);CHR\$(157);SPA PRINTE1, CHR\$(149); SPACE\$(8); CHR\$(151); CHR\$(154); CHR\$(157); SPACE\$(2); CHR\$(14 1845 PRINT£1, CHR\$(149); "REFECT-"; CHR\$(149); SPACE\$(5); CHR\$(149); SPACE\$(7); CHR\$(14 ";CHR\$(151);STRING\$(2,154);CHR\$(32);STRING\$(2,154 1860 PRINT£1,CHR\$(149);SPACE\$(13);CHR\$(240);SPACE\$(7);CHR\$(149); 1865 PRINT£1,CHR\$(147);STRING\$(7,154);CHR\$(155);STRING\$(5,154);CHR\$(155);STRING\$ 1765;CLS62:IMPUT£2,"Type in the number of the STOLEN OBJECT (1-7)";og the weapon was in the ";r\$(gw):INPUT£2,"(y/n)"; ";CHR\$(149) PRINTE1,CHR\$(150);STRING\$(8,154);CHR\$(158);STRING\$(12,154);CHR\$(156); GOSUB 1765:CLS£2:INPUT£2,"Type in the number of the WEAPON (1-3)";wg GOSUB 1765:CL8£2:INPUT£2,"In which room was the weapon (1-14)";gw PRINTE1, CHR\$(149); "UTILITY "; CHR\$(149); "CONSERVATORY"; CHR\$(149); PRINTE1, CHR\$(149); " ROOM "; CHR\$(240); SPACE\$(12); CHR\$(149); 1855 PRINTEL, CHR\$ (149); SPACE\$ (7); CHR\$ (149); "FOYER"; CHR\$ (149); " ROOM GOBUB 1765:CL8£2:INPUT£2,"In which room was the body (1-14)";gb 4);CHR\$(158);STRING\$(3,154);CHR\$(241);STRING\$(3,154);CHR\$(157) 1 THE GAME CLS£1:FOR x= 1 TO 14:PRINT£1,x;") ";r\$(x):NEXT CLS£1:PRINT£1, pn\$(pn);" YOU HAVE FAILÆD" PRINT£1:PRINT£1,"YOU ARE NO LONGER A" 1830 PRINTE1, CHR\$(149); SPACE\$(21); CHR\$(149); 1835 PRINTE1, CHR\$(151); STRING\$(3,154); CHR\$(24 PRINT £1,"CRIME BUSTER !" PRINT£1:PRINT£1,"IN FACT YOU'RE OUT OF PRINTEZ, "PRESS SPACE BAR TO CONTINUE" ans\$<>"y"AND ans\$<>"n" THEN 1580 ans\$<>"y"AND ans\$<>"n" THEN 1645 anst <>"y"AND anst <>"n" THEN 1675 CE\$(2);CHR\$(149);SPACE\$(7);CHR\$(149); THEN 1765 ; CHR\$(157); "MORNING"; CHR\$(149); 1789 FUSET:LOCATEE1,1,1:1NK 3,20 1785 FRINTE1.CHR&1150;STRIMG\$(8,1790 PRINTE1,CHR\$(149);"UTLILTY 1795 FRINTE1,CHR\$(149);" ROOM ' GOSUB 1765:PRINT£2,"You say IF gw 1 OR gw 14 THEN 1665 ;STRING\$(3,154);CHR\$(157); IF INKEY(47) (>0 THEN 1755 gw<>wli>ulantgw<>wli>ulant GOSUB 1765: PRINTEZ, "You Wa=1 THEN GOSUB 1710 PRINTEL, CHR\$ (149); "ORY cb\$=INKEY\$:IF cb\$<>"" THEN 1635 THEN 1665 REM: ground floor plan OS . > SAZ THEN Wa=1 49); SFACE\$(7); CHR\$(149); REM :1st floor plan WE . SANZ THEN WE = ] 91;SPACE\$(7);CHR\$(149); pr(pn)=1:p12(pn)=0 VDE THEN (7,154);CHR\$(153); GOSUB 2300 1750 RETURN 11 IF hh 1850 1585 1590 1595 1600 1605 1715 1726 1726 1736 1736 1746 1746 1756 1756 1766 1775 1615 1620 1625 1630 1635 1640 1816 1870 1800 (241 •

## TURN YOUR MILD MANNERED

PC INTO A SUPER

PERFORMER

WITH THESE

**NEW PRODUCTS** 





Upgrade your PC to **3.1 times its normal speed** for less than \$60 with our CPU upgrade. Complete with installation instructions.

**SPEEDCARD:** — Bring the power of an AT to your mild mannered PC with our plug in upgrade card. Nortons rate this card at 7.6 times the speed of a PC.



**VCACHE:** — Supercharge your Hard disk! Vcache drives your hard and floppy disks by 3 times normal speed and higher. In many cases performance approaches that of a RAM disk. 100% compatible.

**VFEATURE DELUXE:** — Beat the DOS 33meg limit! Allows 500 megs in a single drive letter. Allows drives to be combined together or split into as many

as 24 logical drives. Provides unbreakable security features, low and high level formatting, badtrack mapping and user selectable cluster sizes for optimising performance.

FIXT/S: —An unbreakable security system which totally stops booting of the computer. The password is modified by means of a "key" diskette, uniquely locked to the last

assigned password. FIXT/S Also provides booting for your non bootable hard disk.

**DUB 14:** — Configure your AT for many of the non standard drives that are available. DUB 14 potentially increases capacity of your existing hard disk.

Call the HOT LINE 02 - 502 2860

Dealer enquiries welcome.

YOU'LL BELIEVE A COMPUTER CAN FLY!

HELP ON TAP

496 FOREST RD., BEXLEY. N.S.W. P.O. BOX 361, BEXLEY. N.S.W. 2207



2190 PAPER 0:PEN 1:CLS:FOR x=1 TO 39:PRINT MID\$(11\$;x,1);:FOR y=1 TO 30: NEXT:NE xT:PRINT :PRINT	2550 \$FEAL STRAINTERING THRESS SHACE BAN TO COMTINUE: 2560 \$\$=INKEY\$, IF \$A. "THEN 2560 2560 \$\$=INKEY\$, IF \$A. "THEN 2560
x=1 TO 40:PRINT MID\$(12\$,x,1);:FOR y=1 TO 30:	2555 CLS: PEN 1:PRINT"There are 3 weapons with fingerprints" 2570 PRINT"(male or female) hidden in the rooms 1"
FOR x=1 TO 40:PRINT MID\$(13\$,x,1);:FOR y=1 TO 30: POD y=1 TO 30:DBINT MID\$(14\$,y,1)::FOR y=1 TO 30:	2575 PRINT"of which is the murder weapon. This will":
FOR X=1 IO 39:PRINI MID\$(140.X.1);:FOR y=1 IO FOR X=1 TO 38:PRINI MID\$(15\$,x,1);:FOR y=1 TO	2586 PRINT"enable you to distinguish between the" 2585 PRINT"murderer and accomplice"
FOR x=1 TO 37:PRINT MID\$(16\$,x,1);:FOR y=1 TO 30:	
x=1 TO 36:PRINT MID\$(175.x,1);:FOR y=1 TO 36: x=1 TO 39:PRINT MID\$(185.x,1);:FOR v=1 TO 36:	2595 PRINT avoid around using (h) Orth, (s) Outh, (e) ast";
FOR x=1 TO 35:PRINT MID\$(19\$,x,1);:FOR y=1 TO 3	2605 PRINT"At your turn you will be shown a plan"
FOR x=1 TO 12:PRINT MID\$(110\$,x,1);:FOR V=1 TO 36 FOR x=1 TO 5000:NRXT	2610 PRINT"of the floor you are on. This plan"
RETURN	2620 PRINTINGS tien hames of the fooms and 2620 PRINTINGS tien of doorways, Some of the doors"
RETURN	
ZZOW GORDOLZJ: FOR BELL IO JATRADA VOLCETIES FIGHTES FIGHTES FIGHTES FIGHTES. ZZOS FOR EL TO ZI:READ VOLCETIES FIGHTES FIGHTES FIGHTES FIGHTES.	
FOR x=1 TO 15:READ vot(x).lent(x):lent(x)=lent(x)*tempo:N	
ZZ/S FUN X=1 TO 1/:KEAD VOIM!X);IGNW(X):IGNW(X)*TGNW(X)*TGNW(X)*Z260 D=1:RETURN	. 2555 PRINT"ROOM (first floor) and b in the Links. 2655 PRINT"ROOM (first floor) keve to sround floor.
JRN TO	
FOR x=1	ZD/O PRINT 24.75 DRN 3-DRINT"DRRSS SDACF HAR TO CONTINUE"
FOR x=1 TO	2690 a\$=1NKBY\$.1F a\$<>" "THEN 2690
240	
SYMBOL	2690 PRINT'There is also a skeleton key in one of '
SYMBOL	2705 FRINT" can only carry one key at a time. Using"
SYMBOL	
2340 OTHEOL 440:00:00:255:192:192:192:2345 SYMBOL 247:00:00:255:192:192:192:	2/15 PKIMI "CONSUBING. INCHES OF THE TOWN RAVE all."
SYMBOL	2725 PRINT'be able to see what's in the room unless";
SYMBOL	2/30 PRINT"you have a key. Also you may get locked"
Z365 SYMBOL Z56,192,192,192,224,112,56,31,15	2735 PRINT" in one of these three rooms.
SYMBO	2745 PRINT'In 2 code letters.On your turn you wust
SYMBOL	2750 PRINT"type in this code.No other player should";
2340 SYMBOL 254 0 0 0 0 1 9 2 1 9 2 1 9 2 1 9 2 1 9 2 2 2 2 2 2	2755 PRINTISSE the screen during your turn. A list"
	2765 PRINT suspects is shown on the left of the"
	2770 PRINT"screen. As you find them the initial"
2400 DATA 239,2.1596,2.1559,3.1599,11779,2.1906,2.2133,4 2400 DATA 239,2.1596,2.1559,3.1599,11779,2.1906,2.2133,4	
2405 DAIA 239,641296,241295,041297,041297,041297,04129	2760 PRINT Found is shown alongside. The type of
2415 DATA 402.1,379,4,0,3,338,1,319,4,0,3,402,1,379,3,338,1,319,3,239,1,253,3,37	2/00 FRINI Ingerprintario de weapons is also 2790 PRINTShown The initial letter of rooms you"
9,1,319,3,253,1,266,6,284,1.33,319,1.33,379,1.33,425,1.33,379,8	
2420 DATA 236,1:1212,1:190,1:176,1:134,1:142,1:176,1:160,1:190,1:178,2:356/5:0.	2000 PRINT
. 23.25 DATA 239.2.179.6.15967.23967.15967.142.1.8.02.142.1.8.02.142.1.8.	2.265 PEN US. PRINTIPRESS SPACE TO CONTINUE"
0,.2,142,.67,134,.67,179,.67,142,3,159,1,179,6	
2430 DATA N.Q.E.W.N.Q.E.Q.N.Q.Q.W.N.S.Q.W.N.S.E.Q.Q.S.C.W.N.Q.E.	CLS: PRINT"At your turn you
Q,Q,S,Q,W,N,Q,Q,W,N,Q,E,W,D,DWN,N,S,E,W,DQ,S,E,W,Y,S,E,W,Y,S,E,W,Y,Z,S,E,W,Y,Z,Z,Z,Z,Z,Z,Z,Z,Z,Z,Z,Z,Z,Z,Z,Z,Z,Z	PRINT" you are in and a list of its visible
104,0,106,109,0,112,0,0,108,13,0,0,111,0,13,110,0,0,12,13,0,11,108,14,12,10,9,13	2830 PRINT'COntents. A menu displays the following: 2845 PRINT'COTIONS Only one can be used each turn"
11,4+5	PRINT"NOTHING
2440 DATA GUN, HANNER, KNIFE 2440 DATA GUN, HANNER, KNIFE 2440 DATA MERVI AF MINZ VASE FORMET, CASH BOX, STAMDS, C'OTINS, BING	PRINT"PICK UP
2450 DATA DUKE, BUTLER, CHAUFFER, GARDENER, DUCHESS, GOVERNESS, NANNY, MAID	PRINT"SEARCH
2455 DATA FOYER REPETONAL MONTH ROOM-SITTING ROOM-KITCHEN. UTLITY ROOM-CONSERV ATORY DEPRESANCE DATA DETAILS FOR THE STATE OF THE STATE	PRINT"ACCUSE
2460 CLS:PEN 1: PRINT"Your task is to identify the murderer,"	PATAI
2465 PRINT the accomplice, the missing valuable, the	26/0 FALNI 26/0 FALNI 26/2 PRIN'''FFICH If vol. are in the same room as''
24/6 FKINI location of the body, the milder weepon 24/5 FRINT and its location."	
	2865 PRINT" any key they are carrying"
2485 FILINI Women.Af. The Vige of the mirrory 2490 PRINI'Were in 4 seperate rooms(] man and ]"	2895 PRINT's greed number of questions up to 5) is:
	2905 PRINT"possible questions.You must be in the 2910 PRINT"same room as the suspect you question."
2510 PRINT where the body lies at present.	
PRINT" Six valuables can be seen as	2920 PRINITHAL O MARICH FOOD 18 THE (any Suspect)
2520 PRINT'from room to room the seventh is the '	
PRINT"from the house."	
PRINT" Finding	2946 PEN 2:PRINT"PRESS SPACE BAR TO CONTINUE" 2945 a #=INKRY&:IF a #
25-60 PRIMT'NO fitness possible weepens was used."	CLS:PEN 1
2545 FALM KNOWING WIRE BULLOS TOOM WILL DE CL	2955 PRINT"b) At the time of the murder where was"



#### MIDI INTERFACE

ONLY \$59 +\$2 P&P

Write to: C/- P. McNeil 18 Darmody St, Weetangera A.C.T. 2614

Dealer enquiries welcome

Amiga is a trademark of Commodore Amiga Inc.

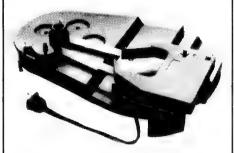
## CAD PRODESIGN II \$550!

Full 2D CAD System. Options include BOM, Autocad conversion, Symbol Libraries.

#### Technical Imports Australia

P.O. Box 176, Crows Nest 2065 (02) 922 6833

#### **ELIMINATE RIBBON COSTS**



Re-ink fabric ribbons again and again for less than twenty cents per cartridge or spool. Our residueless, lubricant ink yields excellent print and there are eight

basic colors apart from black: red, brown, orange, gold, yellow, green, blue & purple. Uninked cartridges are available for many printers.

> Call or write for more information and a list of dealers



PO Box 476, Cleveland, O. 4163 **EXCLUSIVE DISTRIBUTORS** (07) 286 3322 Telex 40472

# Laser printing

direct from your word processor, PC or Macintosh disk or by modem

Now you can produce truly presentation-quality type, and design your own layouts for printing. Send your word processor, PC or Macintosh disk or take advantage of our keyboard entry, design and assembly services. You'll be delighted with the results and amazed at the cost savings

## MACBUREAU

16 Gertrude St, Balgowlah, 2093 Phone (02) 94 5207 now for a free estimate

### IS YOUR HIRE SYSTEM IN A MESS?

#### Then PS HIRE will sort it out.

When you're in the hire business, you need accurate control of both bookings and inventory. That's why one of Australia's most successful hire companies commissioned us to develop a super fast hire control system, which is now available as a package tailored to suit your business.

■ Advance bookings ■ Accounts receivable ■ Invoice/cash receipt printout ■ Sub hire handling Equipment performance analysis

Are all handled by this extensive program. So why not get your hire business organised and phone for a free demo disk to see what we can do.

#### PHONE NOW (02) 759 2298 THE PROGRAMMER'S SHOP

8/117 Punchbowl Road, Greenacre, N.S.W. 2190 Dealer enquiries welcome

P.S. If your business needs a computer system, (large or small), developed to suit, phone for an obligation free quote.

## PAY-IF-YOU-LIKE SOFTWARE AT

donation to the author. If the software is not to your liking you may still keep it.

Documentation is included on diskette. The following is a sample of the world's largest user supported and public domain library . .

Communications with xmodem error detection. Faster than

#310 Qmodem

Assembler with tutorial. Great way to learn assembly language!

# 10 Chasm, the CHeap ASseMbler

Draw on your computer screen.

#344, #345 PC Key Draw

Spreadsheet, simpler than Lotus but effective. \$26 \$13

\$13

\$13

\$26

\$13

\$78

\$78

\$13

ENEW & \$13

BASIC tutorial. A nice way to learn BASIC with a cute

introduction.

# 105 PC Professor \$13 Word processing

☐ #294 Edit
☐ #78 PC-Write

Music to soothe the soul. \$13

#279 Pianoman \$13 Disk cataloguing program. Keep track of that growing pile of

floppies.

# 106 Diskcat \$13

#417 Prolog and Uniforth \$13

#418 Xlisp — experimental version of Lisp \$13

Games, Some of the most interesting games on, or off, Earth! \$13

#293 Arcade Games #390 Flight and others #274 Best Games \$13 Recover lost files. A file examine/repair utility, similar to

#133 Ultra Utilities \$13 DOS Help and explanations for the new user with descriptions of DOS. Just type "HELP"

☐ #254 PC DOS Help \$13

\$13 Housekeeping. Some of our favourite utilities.

□ #273 Best Utilities \$13

Unprotect popular software. Allows backup or transfer of software to a hard disk.

#184, #376 \$26

**Typing Tutor** to train those digits to dance. #320 Touch Type

Something for Lotus lovers:

Collection of Lotus 1-2-3 worksheets and macros (6 disks)

Something for programmers:

Collection of C language disks (6 disks)

Collection of Turbo Pascal disks (6 disks) ≥ NEW Outperforms Word and Think Tank
#480 PC Outline

Practical and educational "what if" simulations #488 Lightyear

Membership
Directory, Newsletters, 'new releases' hot sheet, and more, is yours as a PC - SIG member.

PC-SIG Membership fee

1000 Plainties to choose from. Why pay more? Around 600 Diskettes to choose from. Why pay more?

Members' Special to close the year — Order 25 disks for \$245.00 and save \$\$\$. This offer expires 31 December 1986.

Please add \$5.00 postage and handling on each order

□ Bankcard ☐ Cheque Total \$

Card No. Exp. date \_\_\_\_\_Signature \_

Name

Address State Postcode

Write: P.O. Box W42
West Pennant Hills

Or call (02) 875 3538



• • • • • • PEN 2:INPUT "DO YOU WANT INSTRUCTIONS AGAIN (Y/n)";1\$
IF 1\$<\*\*Y" AND 18<\*\*P\*\*"THEN 3070
IF \$= "y" THEN 2460 PRINT"when questioned about the whereabouts of"; PRINT"the murderer." PRINT"the accomplice will answer truthfully if"; "The whereabouts of every suspect at the"
"time of the murder is known by two other"
"suspects(including the person with them"
"at the time of the murder).All suspects"
with the exception of the murderer and" PRINT"the accomplice with the location of the PRINT"other suspect whose whereabouts he knew. PRINT"The accomplice will use similar tactics" PRINT"ends.You are advised to have pencil and" PRINT"paper with you to make notes" PRINT"and the accomplice will lie to protect" PRINT"each other.When questioned, the murderer" PRINT"will switch the location of the You will then have the opportunity to" love to another room before your turn" PRINT"they can.When questioned the muderer" PRINT"move to another room 3015 3020 3025 3050

# Commodore 64 IRQ Programs and Memory Saving by Justin O'Brien

MCROTEX 666

This program is available electronically through Microtex 666's software downloading service. It is accessed through Viatel page \*66637#.

In the 'Your Routine' part of the program, insert the machine code instructions to be executed. An example is: with some knowledge of machine ne first of these tips allows any user code to run simple tasks in a way that doesn't slow down the operation of Basic programs. It makes use of

(increases 100 DATA 238,0,208 coord of sprite 0)

(increases y 120 DATA 238,32,208 (flashes the 110 DATA 206,1,208 coord of sprite 0)

To stop the computer executing the added routines, press Run/Stop border)

\$314 and \$315 enables a short

machine code routine to be executed before the normal system servicing

The program is as follows:

at location \$EA31.

occurs every sixtieth of a second to scan the keyboard, and so on. Changing the pointer at locations

the IRQ service interrupt which

The second tip allows all areas of memory to be saved to cassette, not and RESTORE.

POKE 45, (low byte of end address of POKE 43, (low byte of start address POKE 44, (high byte of start address) ust the Basic text area as normal of memory to be saved) This is done as follows:

POKE 46, (high byte of end address memory to be saved +1)

SAVE "filename"

REM DATA \*\*\*Your Routine\*\*\*

DATA 120,162,15,142,20,3 DATA 162,192,142,21,3,88

10 x=49152 20 READ a 30 IF a=225 THEN 120 40 POKE x,a 50 x=x+1 60 GOTO 20 70 DATA 120,162,15,142,; 80 DATA 162,192,142,21,5 90 DATA 76,174,167 110 DEM DATA \*\*\*Your R

makes the interpreter think that the This method cannot be used from within a Basic program because it

Basic

ŏ

\*\*\*Rest

Program\*\*\* 130 REM

SYS 49152

program is in a different place than it allows the same thing from within a Basic program. The first part is the assembly code used, the second a actually is. The routine in the listing Basic program to put it in memory. When it is in memory, it can be used as follows:

POKE 251, low byte of start address

POKE 252, high byte of start address POKE 254, high byte of end address POKE 253, low byte of end address

Next, print the required filename in and, finally, type SYS 49152. All this can be done from within a Basic (memory locations 1024 to 1038) the top-left corner of the screen program.

# **MBasic Structured ON ERROR**

## **by MJ Buja**

One facility which Microsoft Basic ON ERROR GOTO statement since it can only branch to one line. This tip lacks is a case-type structuring of the provides a short bit of code which 1000 ON (INSTR (ERR.CODES, STR\$ (ERR)>-1)/+1 GOTO <TRAP.1>, 20 ERROR.CODE\$=STR\$(<ERR.1>) +STR\$(<ERR.2>)+STR\$(<ERR.3>) 10 ON ERROR GOTO 1000 gets around the problem. <TRAP.2>, <TRAP.3>

ERR.1, ERR.2 and ERR.3 are the They do not have to be strung there will be an extra space in this case). Line 1000 searches the string for the code and returns a value error codes which are being trapped. together with STR\$ but can be numwhich corresponds to the code position, and causes a branch to the bers within quotes (remember -1010 ON ERROR GOTO 0 appropriate line.

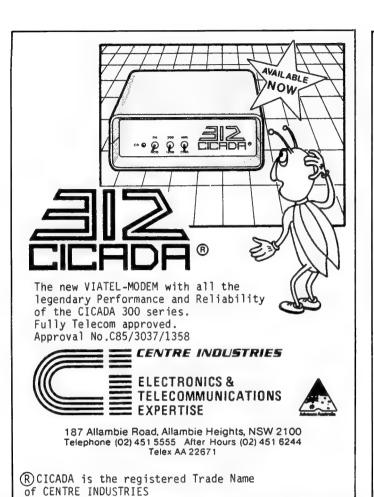


## **NordStar Tips** by Mandy Alford

In response to the WordStar tip given by M Rhodes in June's 'Program File', spacing onscreen and print out in double-spacing. Use LH commands at here's a simpler way to edit with single-

the start of the file. LH12 to give one-and-a-half spacing and .LH16 to give double-spacing. This facility can be added and removed at any time from the start of the file.

)	-	•			•		•	)		•		•	•
	#\$01	#\$01	<b>江江3</b> #	5FFEA	# <b>\$</b> OF	#800	#\$∪4	5FFE()	#5FF.	\$P.D	8 FE	4FFLS	\$A7AE
			LDY										
				ተ				11				T.	A.7.
	0.1	0.1	7.	EA	OF	00	04	BO	FF	근	1. [1]	3	ΑE
	AS	A2	AO	91	A S	AZ	AO	ð,	C.Y	AP	A 4	S	4
	0000	0000	C004	9600	600 -	(1000)	G00D	COOF	0.013	4(0)4	976	010	8705
				-									
		•		(	•		•	)		•		(	•



#### **EASTCOM**

We like to think we offer more than great computers. We also offer great Service and Support. Why not call in and talk to us, we're not only interested in your money we're interested in you.

At Eastcom we sell components and consumables. At the moment we have floppy discs on special, a packet of 10 per \$20.00. Our Eastcom PC 640k, Japanese components, color graphics cards, multi I/O card, and 2 x 360k Japanese drives for \$1799 also RGB color monitors from 4650 and 20 megabyte hard drives from \$950.

CALL US ON 03 288 3611

EASTCOM 168 ELGAR ROAD, BOX HILL SOUTH 3126



#### SATCHEL HAS - 6 MODULES

\$895

- 1. INVOICING
- 2. ACCOUNTS RECEIVABLE
- 3. STOCK CONTROL
- 4. SALES REPORTING
- 5. ACCOUNTS PAYABLE
- 6. GENERAL LEDGER

OPEN ITEM OR BALANCE CARRIED FORWARD

PUBLIC DOMAIN SOFTWARE OVER 600 IN STOCK

### SOTEC/DATAVIEW PC-PORTABLE

PHC-16 \$3,100.00 PHC-1605 \$5,980.00

CENTURY ASI-PC-XT-TURBO

COMPLETE 640K-TWIN DRIVE
MONITOR — PRINTER
WITH\_ SATCHEL — ACCOUNTING PACKAGE
WORD PROCESSOR — SPREADSHEET
& DATA BASE S/WARE
12 MONTH GUARANTEE

#### **CENTURY 826 PC-AT-MINI**

10 MEG CLOCK SPEED. 15 ON NORTON UTILITIES 1 MEG RAM. IDEAL MULTI-USER

#### CENTURY 8264 PC-AT

WITH ABOVE FULL SIZE PLUS 4 SERIAL PORTS ON MOTHER BOARD. CAN RUN 5 TERMINALS AS IS.

PC-SPEED CARD GET 10 MEG OUT OF A PC \$450.

## ROLAND PLOTTERS DRAW AND PLOT ANYTHING MODEMS FOR VIATEL OR RBBS COMMUNICATIONS

#### RENT OR BUY A COMPUTER 03-819-3083 COOLDALE COMPUTERS

LEASING OR FINANCE AVAILABLE

03-429-5844 ABACUS COMPUTERS 03-288-9067 ABE COMPUTERS 03-429-4780 CENTURY COMPUTERS 03-819-3083 COOLDALE COMPUTERS
03-819-1363 DOLP ACCOUNTING MACHINES
03-288-2144 VIATEL COMPUTERS

SOLE AUSTRALIAN
DISTRIBUTORS LISTED ABOVE

#### PROGRAM FILE

APC is interested in programs written in any of the major programming languages for all home and small business micros. When submitting programs please include a cassette or disk version of your program, brief but comprehensive documentation, and a listing on plain white paper —typed if vou have no printer.

Please ensure that the software itself, the documentation and the listing are all marked with your name, address, program title, machine (along with any minimum requirements) and — if possible — a daytime phone number. Check through the previous Program listings to see the kind of programs we prefer. As a rough guide, original ideas are always welcome, as are good implementations of utilities and applications. Obviously the programs should be well-written, easy to understand, and preferably not too long (remember that other readers have to type them in).

All programs should be fully debugged and your own original, unpublished work. We prefer to receive programs with a maximum 80-column width printed

in emphasised typeface.

We will try to return submissions if they are accompanied by a stamped addressed envelope of the appropriate size, but please keep a copy of everything. Programs are paid for at the rate of \$20 per page of published

Send to APC Programs, Att. Stephen Crowley, P.O. Box 666, Fitzroy 3065.

## Learn how to Program and Use PERSONAL COMPUTERS

vou can learn everything you always wanted to know about personal computers. How to program in BASIC. How to understand and use more than 80 BASIC commands and functions. How to write and run your own programs ... for both personal and business applications. How to use pre-packaged software and change it to meet your special needs. How to make sense of the overwhelming

International Correspondence Schools Department of Computer Training (PC) 398 Pacific Highway, Lane Cove, NSW 2066

maze of books, information and advice available at your local computer store.

Sydney (02) 427 2700 or Austwide (TOLL FREE) (008) 22 6903



SEND FOR FREE FACTS!

More Than Just A Computer Manual

This is more than just another programming manual ... it's an entire comprehensive course written by experts. Yet, because it was especially developed for home study, you learn everything right in your own home without changing your job or lifestyle, without attending a single class.

To thi CO

LUS You Get Your Own Computer	
give you practical hands on experience,	
s course includes your own personal colour	
mputer - the VZ 200 with 24K of memory	
yours to keep!	
MAIL COUPON TODAY	CA WARRED
International Correspondence Schools Department of Computer Training (PC)	DYTEGRATI

Since 1890	International Correspond Department of Computer 398 Pacific Highway, Land	Training (PC)	MEMBER
IVIT/IVITS/IVIS	(Please p	rint clearly)	Age
Address	-		
		P/code	
	02) 427 2700 or - FREE) (008) 22 6903	Phone(Option	nal)

## **Coloured Computer Paper**

Now available in 3 different colours, yellow, pink and blue.

$11 \times 9\frac{1}{2}/70$	
WORD PROC. PAPER	
W250 Pack	7.85
W500 Pack	\$15.39
W1000 Pack	\$29.50

Also available in boxes of 2,000 & 2,500

A4 WORD PROC. PAPER	}
A-4250 Pack	\$8.28
A-4 500 Pack	18.20
A-4 1000 Pack	35.80

Also available in boxes of 2000

(Also pre printed STD inv/stat formats.
All prices include S.T. Plus packing & postage)

11 × 15 PLAIN C	OR B.H.S
LP 250 Pack	\$8.45
LP 500 Pack	
LP 1000 Pack	\$31.50
Also available in boxes	of 2,500

COMPUTER	ADDRESS LA	BELS
37x102—2000	Labels	\$35.00
24 x 89-2000	Labels	\$23.15

Also available in boxes of 10,000

11 x 9½ Coloured computer par	oer
One Colour Pack	\$13.50
(250 sheets) Candy Pack	\$19.50
(100 sheets each colour, plus white)	



PHONE (03) 553 2100

DEALER ENQUIRIES WELCOME
141 Herald St,
Cheltenham 3192
P.O. Box 773, Cheltenham
All prices R.R.P.

# ATTENTION BUDDING COMPUTER GAMES WRITERS

If you have written a computer game that you think is good enough for the world market, ECP would like to talk to you. As you are aware, ECP is a major supplier of entertainment and computer distribution for Epix, Electronic Arts, Elite, Microgen, Ariolasoft and Domark. Please contact Kevin Davis on (02) 949 7300 or write to ECP.

Entertainment & Computer Products Pty Ltd 3A/3 Kenneth Road, Manly Vale, NSW 2093

Just released in the U.S. already the subject of a book and being proposed as an industry standard!

#### MOPI

a universal assembler.

The same code can be assembled to virtually any 8,16 or 32 bit processor – chosen at assembly time. For information:
Write / ring PTIZAN Computer Services
Box 69,Belconnen 2616 ph062 586823

## **PC-SIG**

PUBLIC DOMAIN SOFTWARE

THOUSANDS OF MS-DOS PROGRAMS

- MEMBERSHIP DIRECTORIES, NEWSLETTERS \$30 EACH
   DISKS \$13 EACH
- POSTAGE \$2.00 PER ORDER AUTHORISED PC-SIG DEALER

#### Technical Imports Australia

PO BOX 176, CROWS NEST, NSW 2065. (02) 922 6833





#### SOFTERM PC CONNECTS YOU WITH MAINFRAMES.

Now you can access information services. bulletin boards, electronic mail systems, and even your company's computer from home or office. Softerm PC includes keyboard macros, a built-in phone book for automatic dialing simultaneous capture to print or disk, and much more. Softerm PC's extensive file transfer capabilities provide automatic execution using command files, support for popular protocols like XMODEM, and our own Softrans™ protocol which comes with an adaptable program for your host computer.

#### INTERGRATES COMMUNICATIONS WITH ANY PROGRAM.

Now you can add concurrent communications to all your favourite programs. Just load Softerm PC into your computer's memory so it will remain resident while you use other programs. Then, with a single keystroke, you can interrupt the current program and use Softerm to print or display files, dial a host computer, use terminal mode, or initiate a file transfer. You can return to the interrupted program and continue working while the other tasks are performed concurrently.

#### SEAMLESS INTERGRATION AND "ONESHOT" NOW INCLUDED

Seamless intergration provides a transparent, micro to mainframe link to any PC-DOS application.

Assigns unused device specifiers such as H: and I: to represent remote systems. ONESHOT from Dataview now included. Allows textfiles to be converted into 7 different formats including: WKS, WRK, DIF, SYLK, etc.

Softerm PC includes exact emulations of more than 30 popular terminals. All keyboard and display functions are provided for both conversational and block modes.

#### SOFTERM PC IS A COMMUNICATIONS BARGAIN.

#### **TERMINAL EMULATIONS**

TTY Compatible ADDS Regent 20, 25, 40, 60 ADDS Viewpoint, Viewpoint/78 Data General D200, D410 Datapoint 3601, 8220\*

TeleVideo 910, 921, 925, 950 Texas Instruments Model 931 TRS-80 Model 16 Console Wyse 50° **User Defined** 

Digital Equipment VT52, VT102, VT220 Hazeltine 1400, 1410, 1500, 1520 Hewlett Packard 2622A, 2624B\* Honeywell VIP 7205, 7801, 7803, 7813\* IBM 3101 Model 10 and 20, 3161\* Lear Siegler ADM-2, ADM-3A, ADM-5 \*Coming Soon

Softerm is also available in versions for the NEC APC III, Tandy 1000/1200, Wang PC, TI Professional, DG1, Gridcase and Apple IIe & IIc, MacIntosh version coming soon.

#### New Release 1986

Additional protocols available in the 2086 release of Softerm PC will include KERMIT (the public domain protocol developed at Columbia University), Hayes Verification Protocol (Smartcom). and CLINK (Crosstalk).

#### WORDCOMM

#### **TAIWANESE**

#### ADVERTISING FEATURE

#### by Ben Lin, System Engineer, Marketing Intelligence Centre.

Taiwan's PC industry has made remarkable progress in the past few years. The first 8-bit Apple II compatible machine appeared on the local market late in 1981, and shipments grew quickly in the following two years. 16-bit IBM PC compatibles showed up at the end of 1983 in Taiwan, replacing the 8-bit machines on the market.

Currently there are some 200 PC manufacturers in Taiwan, many of them have less than 10 employees, and you may find a three-man company by chance. The number of manufacturers with 'sigshipments nificant' is estimated at 30. and their combined shipments account for more than 90 per cent of the total shipments of PCs exported or sold to local users.

Around 850,000 PCs were exported by the top 20 PC manufacturers in 1985. The captive production of Atari, Wang and Wyse accounted for 700,000 of that total.

Some 60,000 PCs were sold to local users in 1985, with 16-bit machines occupying the lion's share. The 8-bit machines are predicted to phase out in less than 2 years. By now, virtually no office or serious users will buy 8-bit machines.

Compared with the situation two years ago, local users are very concerned about the Chinese manipulation capability of their computers. Earlier, Chinese manipulation cards were added in to the Apple or IBM machines to make them 'Chinese Computers'. The bit-patterns of the Chinese characters are stored in the EPROMs on a card, and English-version application software is somewhat modified to give limited Chinese I/O capabilities to the system. Recently, these add-in cards have been replaced diskettes with I/O drivers Chinese and character patterns.

research project sponsored by the Industrial Development Bureau of the Ministry of Economic Affairs last year had identified the workstation one of the most promising products for Taiwan's computer industry in the near future. Earlier this year Multitech, the top computer maker on the island, had demonstrated its prototype 32-bit CPU-based workstation. bringing the technological. horizon of Taiwan up to a new era.

As the demand for PCs increases, local manufacturers are paying more and more attention to the lucrative peripheral market. 1985 was not a good year for the local FDD (floppy disk drive) makers, and exports of monitors decreased by 5 per cent in value. Exports of printers, however, enjoyed a 95 per cent increase in value, and manufacturers are optimistic for the future. (See Table 1).

The first six months of 1986. however. have produced different a picture for the export of peripherals. FDD exports are growing while printers decreased considerably. Taiwan has been famous its monochrome for monitors in the past years,

and now corporate efforts are directed to the colour models.

Currently there are two HDD (hard disk drive) manufacturers in Taiwan. Cogito had been in this industry for quite a few years and released its 20Mb models recently, sales are reportedly quite good. Another HDD manufacturer, Tatung, one of the top home appliances makers, is now in full scale production on an OEM basis.

Add-on cards, such as RAM cards, color graphics cards. FDD controller cards, multifunction cards etc, together with other accessories, totalled remarkable export revenue of \$US256 million in 1985. an increase of 146 per cent over the previous year. In fact, there are a considerable number of add-on card makers on this island. They offer good quality products and welcome OEM orders.

	1984	198	1985		
	Revenue	Shipment	Revenue	Growth	
Microcomputer	152.3	86Ø Ø	239 7	57%	
Disk Drives	85 8	549.0	41 7	-51%	
Printers	22.9	98.1	44 6	95%	
Terminals	207.1	893.8	225 Ø	9%	
Monitor	318 9	3110.1	3Ø2 5	5%	
Add-on cards, accessories, etc	1Ø4 4	118 5	256.4	146%	

Table 1: ROC export of computer products (1985)

First	6 months of 1985 Revenue	First 6 mon Shipment	ths of 1986 Revenue	Growth
Microcomputer	101.9	325.2	151.4	49%
Disk Drives	21.7	302.4	25.6	18%
Printers	25.6	39.6	17 4	-32%
Terminals	115.2	639.7	148.3	29%
Color Monitor	6Ø.4	449.7	96.4	60%
Monochrome Monitor	87.2	1531.7	112.1	29%
Add-on cards, accessories, etc.	98.3		194.3	98%

Table 2: ROC export of computer products (First 6 months of 1986)

#### Sun Up Computer Company

Sun Up Computer Company established in 1983, produces IBM PC, PC/XT, PC/AT compatible systems, peripherals and addon cards. The company's overall monthly production capacity of these

various products is 8000 pieces per month.

Sun Up employs some 60 personnel, all working to generate high quality products that can be offered at competitive prices.

#### **TAIWANESE**

The company's main export markets are found in West Germany, France, Italy, Australia, and South America. In 1985, the company had an average monthly export volume valued at NT\$17,500,000. monthly average The 1986 targeted for NT\$30,000,000. Sun Up is also investing about NT\$10 million for the construction of a new plant. Once that plant has come on line. production capacity expected to move up to 10,000 pieces per month.

New products the company plans to be offering soon include a 100MHz Logic Analyser and modem cards. The ambitious expectations of the company's marketing

personnel include sending experts to markets all over the world.

Sun Up enjoys technical cooperation with both American and French companies and expects that this will lead to a very prosperous future. company's credo 'Develop new products continuously," while the firm's management policy stresses strict quality control and dynamic management. Sun Up Computer

Company
No. 50, Lane 184,
Yung Chi Road
Taipei Taiwan ROC
Tel: (02) 763 0106-9
Telex: 24336 AMUNID
Fax: (886 2) 764 6301



Sun Up's new Logic Analyser

#### Horatian Enterprises

After accumulating almost 10 years experience, Horatian is now a specialist for producing computer connectors and a variety of cables. To keep competitive in the field and retain its good reputation, Horatian continuously makes efforts on research and development for improving products to meet customers demands of all kinds.

In view of the increasing orders, Horatian has just completed its new factory located in Hsin Tien which will give larger productivity.

Horatian connectors are world standard and can be connected with any brand's same series of connectors. In addition, there are three colours: blue, black and white in insulator available.

Horatian's cable products are UL approved, heavily shielded with braid and foil for EMI/RFI protection to block off the

electro-magnetic wave inter-ference for over 90 per cent shelter rate.

Presently, Horatian's main markets are USA, European countries, Australia and South Africa.

Horatian's goal is to expand its outlets to all over the world. Horatian Enterprises PO Box 7-458, Taipei, Taiwan, ROC

## **Chino-Excel Technology Corporation**

The Chino-Excel Technology Corporation is a member of the E-Hsin International Group, the largest trading company in Taiwan. CET is the electronic arm of E-Hsin and has just opened an Electronics Division to market products in that area.

CET currently operates from a three-storey factory in Chungho City. It manufactures semi-conductor chips for the local computer industry and assembles personal computers for the export market.

In 1985, CET had sales of NT\$18 million after only two months of production. This year it expects to sell products worth NT\$400 million. CET recently made an investment of US\$500,000 in a silicon wafer manufacturing plant at the Hsinchu Science Based Industrial Park that

will eventually cost US\$5 million and manufacture products valued at US\$8 million per year.

In the future, CET plans

to produce a work station

with CAD/CAM capabilities for PC layout to complement its work in IC design. It will probably feature the 68020 CPU and be suitable for office automation. CET is also working on projects that will utilise the VME bus and the Unix operating system. Eventually, CET develop its application system and produce new products in the PC board and IC design field. Chino-Excel Technology Corporation 7th Floor, 61 Chung Shan N. Road,

#### **Key-State International Corporation**

Established in April of 1982. Key-State International Corporation produces PCs and interface With over 100 personnel, the company has a current monthly production capacity of 1000 PCs and 20000 interface cards. The range of these products extend through computer and telecommunications products and peripherals, including home com-

puters, CAD systems and telecomputers.

Taipei, Taiwan, ROC

Telex: 21540 EHSIN

Tel: (02) 563 8652

Fax: (02) 531 3241

David Song, the firm's CEO, explained that Key-State now exports to the United States (40 per cent), Europe (30 per cent), Australia (15 per cent), and other (15 per countries. Kev-State's total export volume last year was valued at US\$600,000. The target for 1986 is YS\$900,000. Key-State also plans to expand

## LOWEST EVER

STUDENT PRICE ON

## IBM • PC\* • JX



The new IBM JX incorporates some of the most advanced technology ever applied to personal computers — making it a perfect match for today's easier and more powerful application software packages.

**FROM** 1164

Yes! thats INC. TAX

The IBM JX features a powerful 16-bit 8086 microprocessor, supported by the latest highdensity gate array components to reduce both size and cost while increasing reliability and performance.

The JX provides a high degree of compatibility with the IBM PC family, giving it an outstanding software library to draw from.

A wide range of easy-to-use IBM software helps novice users become productive with minimal learning time.

Model Features

#### JX 1

- 64K Memory
- No drives
- Remote Infra Red KB
- Colour Monitor
- Parallel/Joystick Ports x 2
- Lightpen & Audio Port
- Cartridge Port (great for Lotus)
  DOS 2.10/Basic Inc.
- Sampler/Intro Programs

\$1164 inc tax

#### JX 2

- 128K Memory
- 1 x 360K drive
- Remote Infra Red KB
- Colour Monitor
- Parallel/Joystick Ports x 2
- Lightpen & Audio Port
- Cartridge Port (great for Lotus)
- DOS 2.10/Basic Inc.
- Sampler/Intro Programs

\$1491 inc tax

#### JX 3

- 256K Memory
- 2 x 360K drives Remote Infra Red KB
- Colour Monitor
- Parallel/Joystick Ports x 2
- Lightpen & Audio Port
- Cartridge Port (great for Lotus)
  DOS 2.10/Basic Inc.
- Sampler/Intro Programs

\$1762 inc tax

## MAIL ORDER NOW!

Call direct! Call today! Shepparton (058) 21 7155

The best computer people in the country.

CAMBERWELL: 519 Burke Road **BENDIGO:** 419 Hargreaves Street SHEPPARTON: 11 Edward Street ALBURY (Dataland):

519 Macauley Street

or Authorised Agents

(069) 21 6466

(03) 20 7895

(054) 43 4866

(058) 21 7155

(060) 21 8088

WOLUNDRY COMPUTERS: Wagga \* Advertised prices must be quoted

\* Prices and products subject to change without notice

FREE DELIVERY ANYWHERE IN AUSTRALIA

Australian Personal Computer Page 249

#### **TAIWANESE**

production capability soon. The company will then have a monthly production capability soon. The company will then have a monthly production capability of and 30000 1500 **PCs** interface cards.

the company's On planning board for new products are a Smart Baby AT and a Computerised Discharge Machine. In 703 6422, 704 9740 terms of marketing plans, the company hopes to soon

exporting regularly to South America and Australia.

Key-State currently has cooperation agreements with several foreign firms, among them, UNI-X Pty Ltd, Microhelp Computer, ACV Computer and Clean Computer.

**Key-State International** 

Corporation Tel: (02) 702 8320, Telex: 13299

Fax: (02) 702 2570

#### Microweb

Formed in 1983, Microweb specialises in the production of PC/XT and PC/AT portable computers. The company has a monthly production capacity of 1000 to 1500 units. The products range from custom designed to regular 16/32 bit units. Other items include motherboards and ments with firms in the keyboards. Quality standards of the products extend from middle to high, while prices are kept at a middle range. Orders currently on hand will keep production lines busy

exports primarily to outlets (April 1987). in West Germany, the United States, Belgium, Austria and Switzerland. Sherman Tong is the firm's CEO.

Microweb is now undergoing expansion to raise PO Box 3-10 Hsichih production capacity. Auto Taipei Shen soldering machines will be Telex: 32454 AUTOWEB added to the company's Cable: "AUTOWEB" production equipment and TAIPEI

increased capacity after expansion should rise to 2000-3000 units monthly. The company also plans to start turning out LCD laptop computers and is looking to expand its marketing operations world-wide.

Microweb currently supplied by this company enjoys cooperation agree-United States, West Germany and Portugal and has realised a strong need for further cooperation and better communication.

The company will be taking part in foreign trade through January of next fairs and exhibitions in the United States (November, Microweb employs some 1986) Australia (March 15 personnel and currently 1987), and West Germany **MICROWEB** No. 9, Lane 146, Sec. 1, Ta-Tung Road, Hsichih, Taipei Shen Taiwan, ROC

Tel: 643 1520 (3 lines)

#### **Sanwel-Comp Enterprises**

was established in July, 1984, to produce IBM PC/ Turbo and PC/AT

Sanwel-Comp Enterprises compatible computers and peripheral products. generates a monthly output valued at NT\$1 million. The company employs 30 personnel and the range of the company's product line motherextends from boards to small IC chips. All products conform to America's FCC Class B standards. regulation Prices of the company's broad range of products varv from **US\$15** US\$400. Orders currently on hand run through November.

Main export markets for the company are found in the United States and The firm's Australia. exports last year came to US\$1.6 million and the target for this year is US\$3 million. Market expansion plans to seek to enlarge US

and Australian outlets and move into Europe. The company has NT\$5 million for expansion investment and expects to increase monthly production volume to US\$400,000 once the expansion has taken place.

For the future company is looking into the production of other computer related items and hopes for marketing breakthroughs in Europe. It currently has cooperation agreements with US firms: KISS Computer Corporation and SCS Systems. The company will also become more active in local and foreign exhibition.

#### **Comdek Industrial Corporation**

Comdek Industrial Corporation specialises in the production of colour monitors, monochrome monitors, PC PC/XT, PC/ AT interface cards and switching power supply units. The company has a monthly production capacity of 1000 units per month for its colour monitors, 8000 units per month for its monochrome monitors and 10,000 pieces per month for interface cards.

Comdek was established March 1985 and employs 50 personnel. Its colour and monochrome display monitors and interface cards are all suitable for IBM compatibles. The firm's EGA colour monitors satisfy high quality, high resolution requirements. While these products are of high quality standard, they are priced very competitively. Orders currently on hand cover production through the next three months. Existing export markets are found in the USA, Canada and Europe. The firm has

an export volume valued at US\$3 million last year and has set a target of US\$5 million for this year.

Comdek expects another invest US\$0.5 million to expand production capability and turn out more switching power supply units and PCs. Production capacity is expected to increase 20 per cent including modems, portable PCs, and multisync display colour monitors that can run from 15 to 31KHz of horizontal scanning. For a new marketing outlet. the company is now looking to Australia.

Comdek Industrial Corporation PO Box 30-115, Taipei, Taiwan, ROC Tel: (02) 396 4526 Telex: 13309 YUHYEANG Attn: COMDEK

A continuation of Taiwanese company profiles will be featured next month.



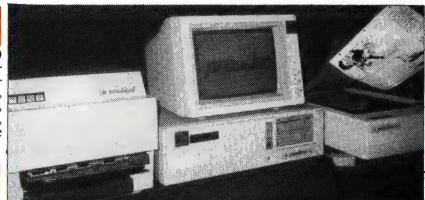
## Desktop Scanning & Publishing

#### YOU NEED TO UNDERSTAND

In Computers IBM (tm) compatibility is a MUST because to have IBM compatibility means more software, more monitors, printers, modems, expansion cards, plotters, etc are available for your system.

#### WITH DESKTOP **PUBLISHING**

Obviously IBM Compatibility in P.C's must be the choice.



tion ready to be manipulated in many ways and print out in 10 seconds is a long overdue requirement in D.T.P. Page scanning and is a MUST in a complete system. Not only is it an enormous time saver, scanning will open up a whole new field of applications.

#### **SAVINGS:**

In every type of organisation and business, printing is a major expense. Printing is used in letter-

heads, company stationary and manuals, bulletins, newsletters, forms, advertising promotions to just name a few.

To be able to prepare your own artwork, finished art in medium sized runs, do your own printing, can mean an enormous cost saving that soon results in a profit from your investment.

Also, the ability to translate your own style in your own way, make changes and try different formats in your own office adds a new degree of speed and efficiency which you have never experienced before.

Your company cannot afford to be left behind in today's fast and competitive market place, new ideas and deadlines give you the boost to achieve improved results and a better company bottom line.

#### WITH FONTS OR TYPESETS

H.P. Compatibility is the choice for similar reasons. More independant vendors are using H.P. as the compatible standard.

#### WITH LASER PRINTERS

Canon engines seem to be the way to go judging by the number of makers of laser printers who chose Canon as its base.

#### WITH MONITORS

The higher the resolution the better, even though at present addressing resolution is limited, but your system must be functional on a standard R.G.B., E.G.A., and monochrome monitor.

#### WYSIWYG OR NOT

"What You See Is What You Get" is a term you win be familiar with when you use D.T.P., it means what's on the screen is what it prints but, with software that allows embedded commands or strings of instructions in your text editor and word processor to execute page formatting with text and graphics.

#### PAGE SCANNING

Up to now software was the major means of input into your D.T.P. system but there is limitations in software input. To be able to place text, graphics, pictures, 3D objects onto a Flat Bed Scanner, allowing you to input that image onto your computer screen in 9 seconds maximum at 300 D.P.I. resolu-

#### SYSTEM:

Because D.T.P. is made up of integrated units such as a computer, monitor, scanner, laser printer, and software to purchase the fully matched system from a single source has decided advantages. President offers a complete system, a matched system to give your company the support and confidence only a 16 year old Australian company can offer. Computer and Scanner Australian Built.

#### PRESIDENT PAGE MASTER III SYSTEM:

★ PRESIDENT 30 M/BYTE A.T. COMPUTER ★ PRESI-DENT TVM 3 COLOUR MONITOR ★ PRESIDENT AVR-300 FLAT BED IMAGE SCANNER ★ PRESIDENT CANON LASER PRINTER ★ PRESIDENT MEGASCAN SOFTWARE **★ PRESIDENT 1.3 M/BYTE MEGABUFFER ★ PRESIDENT** SYSTEM MANUALS & CABLES.

#### PRESIDENT AVR-300 DESKTOP PUBLISHING AND SCANNING SYSTEM!

LEASED FROM \$12.95 PER DAY

**MELBOURNE** SYDNEY

BRISBANE **GOLD COAST**  STH AUST

**WEST AUSTRALIA** 

(02) 4762700 (02) 387 366

(03) 347 0555

(07) 523 288

(075) 374 788

(08) 212 1799

(09) 328 6522

## AN IDEAL COMPUTER FOR A BEGINNER

WHY BUY A CHEAPIE CLONE WHEN YOU CAN BUY A **GENUINE MS-DOS COMPUTER FOR LESS!** 

was \$3,250

THE APRICOT F1e INCLUDES

Now \$1,250

- 8086 CPU (FASTER THAN THE 8088 IN IBM P.C.)
- 256 Kb RAM
- 1 x 360 kb FLOPPY DRIVE
- INFA RED KEYBOARD

#### EACH APRICOT F1E COMES WITH A COMPLIMENTARY PACK OF

SOFTWARE:

- 1 x INTRODUCTORY LESSON
- 1 x SUPER CAL (SPREAD SHEET PROGRAM)
- 1 x SUPERWRITE (WORD PROCESSING PROG.)
- 1 x SUPER FILE (DATA MANAGEMENT PROG.)

WE ALSO SELL THE FASTEST IBM X T COMPATIBLE COMPUTER H:TEK TURBO PL WTH 10 MHZ/4.77 MHZ SPEED BASE MODEL STARTS \$1.350

HIGH TECH COMPUTERS **GND FLOOR, 144 PACIFIC HWY** NORTH SYDNEY N.S.W. 2060

PHONE: (02) 957 6358



#### IBM COMPATIBLE PC/XT TURBO (8 MEG)

- 640K Ram on mother board
- \* Parallel & serial ports
- \* Real time clock, batt. backup
- \* 8087 socket
- Key switch turbo
- 8 slot socketed mother board
- \* Delivery Australia wide \$20
- Twin 360K drives (Japanese)
- Games port
- Color graphics card
- Front mounted reset switch
- \* LEDS for turbo & hard drive on
- \* 150 Watt power supply
- \* 12 months full warranty

#### AT STYLE CASE & KEYBOARD

**FULL RANGE OF PERIPHERALS INCLUDING** 

- 12" Hi Res. Comp. Mon. Green-Amber \* 12" TTL Hi Res. Mon. 720\*348
- 14" RGB Hi Res. Mon. 720\*240
- Epsan CX86 Printer with Tractor
- 100 key keyboard extra
- **Z-Nix Mouse**
- DSDD Diskettes box 10
- Printer Cables
- CPBH80 Printer 80 col. 160 CPS
- CPB-HI36 Printer 15" 160 CPS
- \* 20 Meg. drive with DTC cont.
  - \* Desks and Furiture

## \$1395 including tax

## COMPUTER & ELECTRONIC SERVICES PTY LTD 561 8947 BH WHEELERS HILL VICTORIA 3150 (03) 561 4683

(03) 561 8947 BH

(03) 561 4683 AH

\$175 \$240

\$695

\$499

\$695

Scall

\$50 \$125 \$22 \$25

#### **COMPUTER REPAIRS**

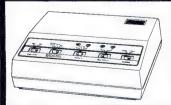
Has your IBM-Apple compatible stopped working? We specialise in repairing power supplies, disk drives, motherboards and peripherals for most models.

#### **COMPUTER & ELECTRONIC SERVICES PTY LTD**

(03) 561 8947 BH

WHEELERS HILL VICTORIA 3150

(03) 561 4683 AH



#### SAITEK PRINTER SELECTOR

Enables 1 or 2 computers with parallel outputs to automatically scan and link up with 1 or 2 printers/plotters which can be selected by software control from the computer(s). Alternatively, panel switches control input/output; LEDs show active channels. INTRODUCTORY PRICE \$149 TAX PAID



## A VIEW TOWARDS THE FUTURE

## Extraordinarily Powerful Videotex Software For The IBM Personal Computer.

"GateWay is so rich in features that it is difficult to be very critical of the product."

"What makes GateWay so good? First of all it's written largely in 8086 Assembler making it extremely fast and allowing for far superior screen control."

PC Australia. July 1986

We've turned Viatel into a blaze of colours and shapes and created a product from the future — but it's available now!

CyberSofts GateWay has set the standard for accessing Videotex information on your personal computer.

The others can only follow.

But the standard videotex software is not your standard software. We've packed more power and features into GateWay than anyone else.

Features like Monochrome, Colour, EGA, Hercules and IBM JX screen support. Features like disk capture and offline review, help screens and easy to use menus.

Features like the unique CyberSoft Learn Option. Teach your computer where to find videotex information by accessing the pages once! The next time you want the same pages they are obtained and stored automatically.

But its biggest feature is that you don't have to be a computer expert to use it. We've taken personal computer communications and made it oh so easy. We've thrown away the jargon and complex commands.

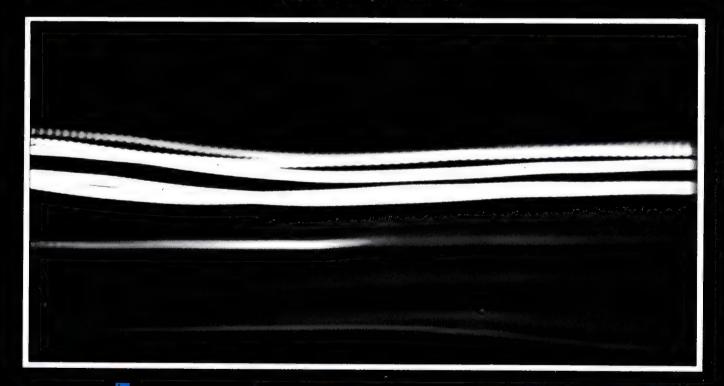
No matter how good the future looks — seeing is believing and \$199 (RRP) buys it at just about every Professional Computer Retailer.

Or a demonstration copy for a refundable \$20.00.

If you are involved in using or providing Videotex information then your business card gets you a complimentary demonstration copy of GateWay.

Please call Heath Rogers on (02) 9574678 for details about our Corporate Support & Development Project.

NetComm Sendata Telecorp. Visionhire, Resource Card, Queensland Education Dept. and Dick Smith have.





P.O. BOX 149, HURSTVILLE, NSW, 2220 (02) 818 3488





#### Dac Easy Gives You Seven Full Feature Accounting Modules In A Single Integrated Package.

Accounting software doesn't have to be expensive to be the best. Dac Easy gives you a fully integrated accounting system with instant access to General Ledger, Accounts Receivable, Accounts Payable, Inventory, Purchase Order, Billing and Forecasting. Imagine, you can generate over 300 reports from 80 different routines ... all in a non copy protected package. And, with Dac Easy you'll get a handsome slipcase binder with easy-to-follow documentation. Best of all, Dac Easy Accounting can be used to manage either service or product oriented businesses

Find out for yourself why Dac Easy is the fastest selling accounting package on the market. Compare Dac Easy's features against other packages costing thousands more. Then, order your Dac Easy Accounting by calling our number or returning the coupon below.

#### SOME OTHER GREAT WINNERS!

#### Dac Easy Accounting Tutor

Dac Tutor makes learning the operation of Dac Easy Accounting fast and simple. Just load the disk in your computer and you'll be guided through each of the seven modules step by step without

ever having to read your manual.

#### Dac Easy Word

\$14500

With Dac Easy Word you get a system that is so simple anyone can quickly learn to type and print a wide variety of documents, but you also get power ... Mail merge, searches, windowing, dictionary, multiple justifications and much more.

#### Pop Up

Pop Up the tool you need at the touch of a key! Full desk top utilities, financial calculator, word processor, pop up D.O.S., modem, daily diary, names, address, etc.

#### Colour Diskettes

\$2900 box 10

Now you can locate everything from Accounts Receivable to Payroll; and you can do it at the speed of colour. Colour Diskettes are the logical solution to data organisation "colour is faster than

Dac Easy Accounting • Best Software . . . InfoWorld • Trendsetting Accounting Product of the Year . . . PC World • Dac Easy is a genuinely amazing deal ... PC Magazine • ... I enthusiastically award four stars and recommend the purchase of Dac Easy . . . Business Software • I've never before in a review come right out and told readers to buy a product but I'm doing it now. Dac Easy is an incredible value PC Week . Dac Easy offers the versatility and flexibility real accounting demands... Personal Computing

#### MACE-SOFTWARE PHONE: (07) 870 3600

Land St & Sylvan Rd Corner Toowong (Brisbane) Qld 4066. Phone now or return the coupon STD enquiries (008) 77 7509. provided.

#### General Information

- Menu dnven
- Password protection
- File capacity limited only by disc space
- Support contract available

#### General Ledger

- Unamited # of accounts with multi-level accounting, unlimited departments
- 3 Year account history for CRT inquiry Pencil & pen feature to correct mistakes
- without reverse entries Unique budgeting routine (see recasting)
- CRT transaction inquiry, unlimited
- Activity report, trial balance, financial statements, etc.

#### Accounts Receivable

- Open invoice or balance forward
- Customized columns for ageing report Unlimited # of customers
- Mailing labels and directories with 4 different sorts
- Automatic finance charges
- Supports partial payments 3 Year customer history for # of
- nvoices, sales, costs, and profits
- Customized text on statements Cash flow analysis
- Sales analysis
- Automatic sales forecasting by customer, salesperson or customer type

#### Accounts Pavable

- Cheque printing and up to 10 invoices paid per cheque
- Automatic allocation of available cash to payables

- Vendor directories with sorting by vendor code, name, or territory
- Aging reports with 7 customized columns
- Unlimited # of vendors
- Mailing labels with 4 different sorts
- 3 Year vendor history for CRT inquiry and printing
- Flexible navment calendar
- Automatic forecasting of purchases Unlimited allocations per invoice
- Inventory
- Supports average, last purchase, and standard costing methods
- Powerful physica, inventory routines Accepts any unit of measure like fractions, dozens, gross/hours, minutes,
- Automatic changing of costing methods
- Time and product inventory 3 Year product history in units, dollars,
- cost, and profits
- Automatic forecast of product sales Automatic pricing assignments
- Alert and activity reports with 11 sorts
- CRT shows on hand, on-order
- committed, sales, cost, profit, turns, GROI

#### Purchase Order

- Usable for inventory and non inventory
- Allows up to 99 lines per purchase order
- Per line discount in ' Purchase Order accepts generic
- discounts, freight taxes, insurance
- Purchase Order accepts back orders &

- Purchase sournal
- Automatic interfacing with General Ledger, Payables, and Inventory

#### Rilling

- Invoicing on plain or pre printed forms
- Prints sales journal
- Automatic updating of committed products in inventory
- Ability to customize invoice for remarks
- Allows return credit memo
- Interfaces with Inventory, Accounts Receivable and General Ledger

#### Forecasting

- Unique program that automatically forecasts using your 3 year history
- Forecast revenue and expense accounts
- Forecast vendor purchases
- Forecast customer sales, cost, and profit
- by customer or salesperson Forecast inventory item usage by 4
- automatic methods
- Forecast by same as last year, or %
- base from last year, or trend, or least square trend line analysis method

#### Minimum Hardware Requirements

IBM (PC)r, PC, XT or AT)1 or other compatibles, 128K memory, one 51/4 DSDD floppy disk, 132 column printer or 80 column printer in compressed mode, 80x24 CRT, MS-DOS2, PC DOS1 2.0 or later

Trademarks of International Business Machines, <sup>2</sup> Trademark of Microsoft Corporation

MACE-SOFTWARE Land Street	& Sylvan Road Corner	, Toowong	(Brisbane) Qld. 4066. I	Phone: (07) 870 3600
Take advantage of our special introdu Tcoupon with your credit card numbe FREE. (Overnight express). (No C.O.D	actory offer by ordering er, money order or chec	Dac Easy S	oftware now. Simply s	end in this
☐ CHEQUE ☐ MONEY ORDER	☐ BANKCARD	☐ VISA	☐ MASTERCARD	☐ AMERICAN EXPRESS
Account No				Expires
Name				
Address City				Postcode
City	5	state .		
Phone	5	ignature		
	TCK APPROPRIATE BOX)			
☐ Dac Easy Accounting \$245	☐ Dac Easy	Mate \$125		Dac Easy Word \$145
☐ Dac Easy Accounting Tutor \$49	Colour D	iskettes \$29 i	box 10	Pop Up *99

Money Back Guarantee: MACE SOFTWARE provides a 30-DAY MONEY BACK GUARANTEE

Page 254 Australian Personal Computer

#### ADVERTISERS INDEX

Aardvark Utilities. AB Office Electronics ACD. Acme. Adaptive Electronics. Addison Wesley. A.E.D. Aktas. Alliance Computers. Amust Computer Corporation Apple. Archive ASP Microcomputers Atlantis International Computer A.T.S. Attache. Aussoft. Automatic Ice Co	208 4 118 75 187 160 78 162 198 198 186 198
<b>B</b> .J.E. Brainstorm Busiware	62,63
Case Communications Centre Industries Chino-Excel Chendai Chua Cipher Comdek Industrial Co. Compet Computer Systems. Complete Technology. Comprador Computer and Electronic Services Computer Enhancements Computer Haven Computer Print and Paper Computer Print and Paper Computer Descriptions Continental Publications CPN. Conductermax Conductermax Conductermax Conductermax Computer Print and Paper Computer Print and Paper Computer Print and Paper Computer Reserved Computers Conducter Services Conducter Services Custom Made Software Cybersoft	243 127 64 55,57 54 210 210 154,155 204,205 252 233 130 125 252 245 174 52,53 174 52,53 186 7,245,256
Dataflow Dataparts Data Sat Datronics Dick Smith Digicom Inc. Digital Resources Dimension Graphics Discware	0,141,249 195 153 192 235
East Computers ECP Efficient Computer Services Electromark Elexpo Elmeasco	245 85 227
airstar Favorable Enterprise Corp. FBN. Fifth Generation Flying Triumph FMS	134 143 177 3,165,167
<b>G</b> arry McCleary Software	117
Hales & Rogers Help on Tap. Hercules Hewlett Packard Hi Technology Hi Tech Computers Horatian Enterprise Hypertech	239 30,31 110,111 8
BM	215 201 88,157

IPL Datron         10           IREE CON         178	Kent Design
<b>J</b> RT Software	Kownai Systems179
JRT Software       160         Kaypro       144         K & C Infocom       217	Ling Yih Co.       221         Logo Computer Centre       108         Lotus Computers       6,142

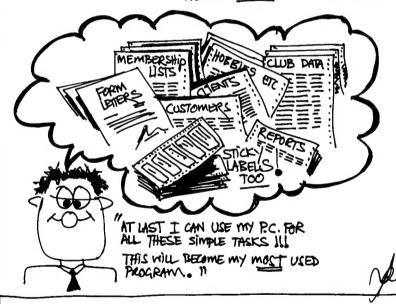
\*AT LAST THE SIMPLE LIST MANAGING SOFTWARE SYSTEM YOU HAVE BEEN WAITING FOR ..... WILL PUN ON A SINGLE FLOPPY DISK SYSTEM OR HAKD DISK. ALLOWS YOU TO CREATE AND USE ANY NUMBER OF PERSONALLY DESIGNED DATA FILES.... ALMOST THE POWER OF A COMPLICATED DATA-BASE IN A SINGLE, EASY TO LEMAN & USE PROGRAM, & FOR A FRACTION OF THE OPET...



ONLY \$66.00 INCLUDING SAIES TAX

- main menu HAS 20 DIFFERENT OPTIONS.
   including..... ADD/modify/output/sort/search/graph
   DESIGN/FORTH LETTERS/STICKY LABOUS/SUMMARY
- · ACTUAL SOVRCE CODE IS SUPPLIED .
- · RUNS UNDER BASICA OR GW-BASIC, WITH MS-DOS.
- · FULL "COLOUR" PROGRAM.
- · Simple DOCUMENTATION & USERS GUIDE.
- · PASSWORD ACCESS

... PLUS MANY MORE POPURES!



ORDER FLORY SEND \$66.00 TO MANDAR'N DISTRIBUTES
PH (07)-2731378 FO. BOX 659
ARCHER FIELD; BRISBANE. 408



#### Monitor Mover™

#### To suit IBM Monitors

The flexible VDU Arm for Space Saving, Good Ergonomics

Available from all participating IBM dealers and Computerland stores



COMPUTER PRODUCTS 39 Dickson Ave., Artarmon, N.S.W. 2064 NETWORK Telephone: (02) 439 8966

Monitor Mover is a registered trade mark owned by Computer Products Network, Sydney, Australia



Back up your copy-protected disks with ESSENTIAL Data Duplicator 4 PLUS ■ EDD 4 PLUS is new technology, not just 'another' copy program. The EDD 4

PLUS program uses a specially designed hardware card which works with your disk drives to back up disks by accurately copying the bits of data from each track. Don't be fooled ... no other copy-program/system for Apples can do this!

addition to backing up disks, **EDD 4 PLUS includes several useful** utilities such as examining disk drives, certifying disks, displaying drive speed rpm's, plus more!

■ EDD 4 PLUS runs on Apple II, II Plus (including most compatibles), and IIe, and is priced at \$190.00 (duodiskI/unidisk 5.25 owners must add \$32.00 for a special cable adapter). ■ A standard

EDD 4 version which doesn't include any hardware is available, and can be used on Apple IIc and III (using emulations mode) and is priced at \$125.00.

Bankcard and Master card accepted by phone.
Add \$3.00 to all orders for postage and handling. All orders must be prepaid.

#### **UTILICO SOFTWARE**

83 HALL ST., BONDI BEACH, NSW 2026 PHONE (02) 30 2105

#### ADVERTISERS INDEX

MacBureau         24           Mace Reel         25           Manacomm         24           Mandarin Dist         25           Martlet Software         20           MC-P Applications         IBM           Megavision         100           Memorex         1           Micro Bee         14,11           Micro Data Management         16           Micro EDP         23           Micro Educational         103,136,13           Micro Help         15           Micro Imports         170,17           Micromania         11           Microway         5           Microway         5           Microway Enterprises         23           Mike Boorne Electronics         60           Minicomp         19           Mitsubishi AWA         8           Modern Computer Corp         21           Multisoft         18	14 11 15 15 16 16 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18
Natwick Management 10 Netcomm 1 Norfolk Data 11	2 7 9
Output Media	8
P.C. Accessories       12         P & C Shiten Enterprises       22         Perfect Information       16         Pieces       24         Plus & Plus Co.       180.18         Porchester Computers       17         President       25         Proware       10         Ptizan       24         Pulsar Electronics       17         Pursuit       20	9 8 1 1 3 1 3 9 9
<b>Q</b> ubie	5
Rampage Computers.       4         Ram Supply       8         RIFA       18         Robs Computer Center       32,4         Rod Irving       35,36,3         Roland       1	7 4 5
Sailing Strong       22         Sant Technology       4         Sanwell Computer Enterprises       21         Select Software       104,105,10         Shaw       14         Siromath       1         S.N.S.       39,14         Software Express       41,71,7         Software Shop       16         Software Supplies       10         S.P.S. Software Product Support       14         Stylus       18         Sun Up Computer Co.       22         Superment Enterprises       22         Syncomp Industrial Corp.       23         Syntax       18	826321990926571
Technical Imports         241,24           Telecom         83,12           Telecorp         69,7           The Computer House         121,12           The Computer Place         17           The Computer Trader         13           The Creative Computer Co         8           The Local Computer Shop         11           The Programmers Shop         24           Tully Compu-Print         9	8 7 9 5 3 0 3 1
United Computers         20           Uni-X         85.8           Utilico         25	37
Verbatim. 2 Viatel Computers 24 Vsoftwarez 21	3
Wordcomm24	

## IBM PC USERS

IBM XT-20MB HARD DISK 640K + MULTIFUNCTION CARD KAGA GREEN MONITOR \$5500

QUBIE 6 PAK 384K

\$350

SYMPHONY S945

INTEL CHIPS

8087 280 80287 465 8087.2 465

NEC P5

PARADOX

\$995

NOVEMBER SUPER PC SPECIAL

IBM — PC2

640K MONO SCREEN GRAPHICS CARD 20 MB

\$3975

**\$450** 

NEC P7 \$1150

IBM PC STORYBOARD \$350 IBM XT — 20 MEG HARD DISK 640K + MULTIFUNCTION CARD ENHANCED COLOR GRAPHICS MONITOR with EGA CARD

IBM/LAPTOP convertible for PC/AT

\$4200

LOTUS 1-2-3 RELEASE 2-01 \$635

DBASE III PLUS

**\$945** 

EGA MONITOR & EGA CARD

\$1525

INTERNAL HARD DISKS

TANDON 20 MB SEAGATE

20 MB

\$1150

\$995

To order or for further information simply call:

SYDNEY (02) 439 7500 MELBOURNE (03) 529 3282 BRISBANE (07) 378 4798

OR THE TOLL FREE ORDER HOTLINE (008) 226 981

Or visit our offices at:

MC-P APPLICATIONS

**SYDNEY:** 2nd Floor, 156 Pacific Highway, St. Leonards 2065. **MELBOURNE:** Ground Floor, 582 St Kilda Road, Melbourne 3000. **BRISBANE:** 2039 Moggill Road, Kenmore 4069.

ALL PRICES SUBJECT TO CHANGE — 3% DISCOUNT FOR CASH.

ALL PRICES INCLUDE SALES TAX.

PLEASE CALL FOR ANY ITEMS NOT LISTED

